CIOs, vendors beware! Power users and powerful technology can be a fatal combination. Leadership Series follows page 32.

Intranet tests: HP and Dell servers score well; NEC packs more bang for buck. Buyer's Guide, page 87

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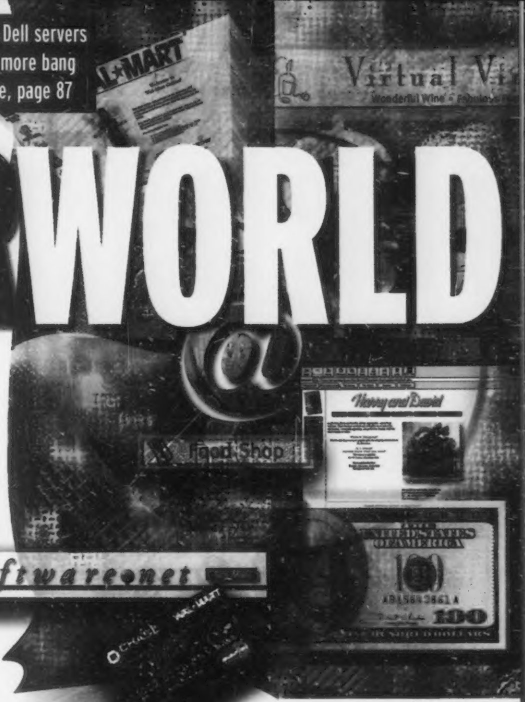


BILL MILNE

Users press to cut PC costs

Management issues stalk desktop options

By April Jacobs

THE DIZZYING array of personal hardware options that are intended to cut costs and simplify desktops may instead create bigger management problems.

Users are unlikely to reap significant cost savings unless managers find a way to integrate and manage the plethora of devices now aimed at them, analysts said. They said PC managers who are overwhelmed by a flood of computing options that include handhelds, laptops, network computers, NetPCs and desktop PCs should stay focused on management costs.

Nathan Brookwood, an ana-

PC costs, page 125

Users say direct sales cheaper, faster

By Mindy Blodgett, Stewart Deck and Matt Hamblen

USERS ARE increasingly turning to direct sales as a cheaper, more satisfactory way to purchase PCs and laptops, with the added bonus of improved service and support, industry observers said.

"The direct sellers don't give up as much margin to resellers, so they can come in at a more attractive price point," said Chris Goodhue, an analyst at Gartner Group, Inc. in San Jose, Calif. He said the direct model lets manufacturers get to know their customers better, which in turn allows them to be very responsive.

Goodhue said a Dell computer "can come in at 10% or even 20% below a Compaq or a Hewlett-Packard or an IBM, depending on the size of the order and the company, and the negotia-

Direct sales, page 125

By Julia King Recruiter Bob Krutak was chatting with a little girl at the neighborhood pool when he learned her father is a **computer programmer.**

Now Krutak is negotiating to **hire the girl's father** for a job at Brannon & Tully, an information systems consulting firm in Norcross, Ga. And if the father is hired, the girl could stash as much as $500 in her piggy bank — referral bonus money that used to be available only to employees.

DIANE FENSTER

Big bucks, page 14

Welcome to www. you-owe-tax.com

By Patrick Thibodeau

WILL HENDERSON'S tax war began with a knock on his door. An auditor from the Tennessee Department of Revenue said Henderson owed more than $100,000 in sales taxes that his Internet access service should have collected from 13,000 subscribers.

Henderson, owner of U.S. Internet, Inc. in Knoxville, Tenn., hadn't collected the taxes because the state tax agency said in 1994 that his service was exempt. But two years later, the department changed its mind, arguing that the company is a taxable telecommunications service because it transmits electrical impulses. So the state now requires Henderson to collect the taxes, although it has backed off the retroactive claim.

The effort by tax-hungry states to collect taxes from Internet service providers "is the first skirmish in the war" over electronic commerce and taxes, said Charles R. Beaudrot, an attorney at Morris, Manning & Martin LLP in Atlanta.

It is a war that will spill over into the world of Internet shopping sites, Beaudrot and other experts predicted.

Already, electronic-commerce sites face a hodgepodge of state laws, and online merchants are worried that the mere presence

Tax laws, page 26

IBM to give Java cross-platform company

▸ *Smalltalk, Basic go platform-independent*

By Sharon Gaudin

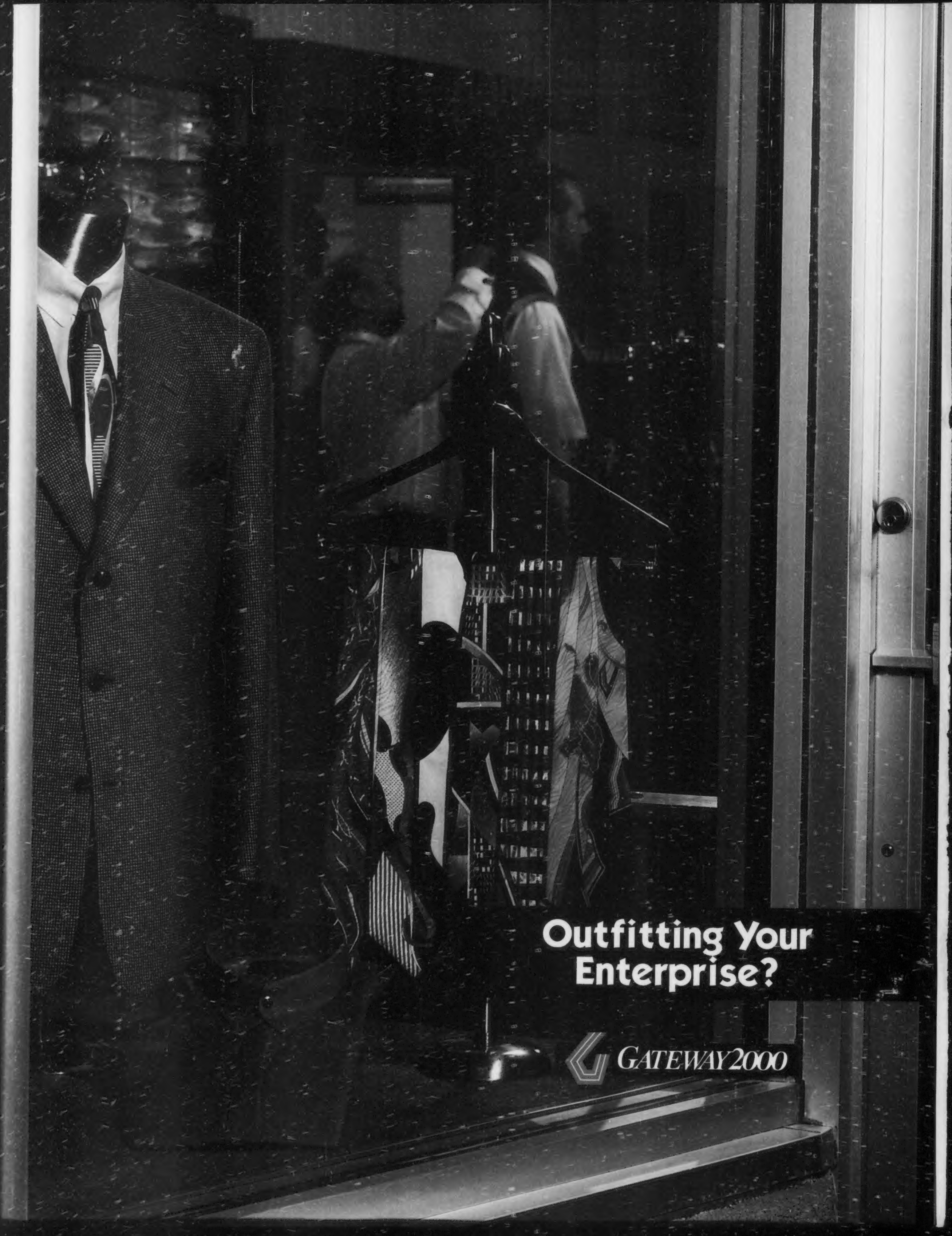
BY YEAR'S END, Java won't be the only cross-platform kid on the block.

IBM last week confirmed it is developing the Universal Virtual Machine, which will let developers use other languages to build platform-independent applications. IBM officials said UVM will enable the company's VisualAge development tools for Java, Basic and Smalltalk to write applications that run seamlessly on multiple platforms.

A virtual machine helps translate an application's language into code that an operating system can understand. Sun Microsystems, Inc.'s Java Virtual Machine translates Java code into a language understood by various individual operating systems — whether a Unix flavor, Windows or Apple Computer, Inc.'s Mac OS.

IBM's UVM is being de-

IBM, page 12


Outfitting Your Enterprise?
GATEWAY2000

A proud Stephanie Reel of The Johns Hopkins Medicine Center, Computerworld Smithsonian winner. Page 16

Random House's David Bruce built a separate repository for detail-hungry users. Software, page 57

Up close and personal with the king of spam, Sanford Wallace. The Internet, page 47

In this issue

NEWS

OPINION

TECHNICAL SECTIONS

CORPORATE STRATEGIES

THE INTERNET

THE ENTERPRISE NETWORK

SOFTWARE

SERVERS & PCs

DATA WAREHOUSING

FEATURES

MANAGING

BUYER'S GUIDE

IN DEPTH

CAREERS

ETC.

> "I was tired of being a death merchant."
>
> ITT Corp. CIO David H. Starr after leaving the defense congolomerate for The Reader's Digest Association, Inc.

See story, page 2

IS job market demands more than technical skills

By Mitch Wagner
SAN JOSE, CALIF.

INFORMATION SYSTEMS managers with Internet skills can still command top dollar — and are likely to continue to do so for years. But they need a broad range of other IS and business skills to compete in the job market, said IS managers interviewed last week at the Netscape Communications Corp. developers conference here.

"You have to have a much broader skill set. The people getting hired, getting top salaries, are not the ones with narrow skills. They have top programming skills, they know networking and databases, and they know business rules," said Bob Ray, a systems engineer at Geometric Results, Inc. in Southfield, Mich., a World Wide Web development subsidiary of Ford Motor Co.

"And [they] have good communications skills. You can put them in front of a customer," Ray added.

> **"The people getting hired, getting top salaries, are not the ones with narrow skills."**
>
> **– Bob Ray, Geometric Results**

When the Internet first became bandied about as a business tool, college students who knew Hypertext Markup Language (HTML) and how to set up an Internet server drew high salaries immediately.

HTML OLD HAT

"Look at what's happened to HTML. When I graduated from college, nobody knew how to do it," said Ori Behar, 27, a computer analyst at The Goodyear Tire & Rubber Co. in Akron, Ohio, who graduated in 1994. "Now the University of Michigan is going to make it a requirement to receive a degree. That'll make that skill less in demand."

Webmaster salaries are still high — typically $60,000 to $90,000, according to a study Meta Group, Inc. in Stamford, Conn., will release this week. But now, basic Internet skills are becoming common, applications are becoming more complex and requirements are more stringent.

Technical skills now required of webmasters include Java, C++ and networking — to connect Internet sites to legacy systems. And webmasters also are required to have people skills to deal with users and, increasingly, business partners with access to the corporate intranet, according to IS managers who oversee Internet and intranet projects.

One example is Sachs Health Care Information Specialists in Evanston, Ill. The company collects medical records and performs statistical analysis on the records for hospitals.

The company wants to use the Internet to distribute results to hospitals. That requires more than Internet skills. Webmasters must understand diverse systems, understand the nature of medical records and confidentiality, be proficient in security and be able to talk to counterparts at Sachs's customer hospitals.

"The Internet is a tool. You can be a mechanic, someone who makes the tool, but the money will be for someone who can use the tool to create content," said Terrance Roddy, a senior software engineer at Sachs.

But although the increasing complexity of the Internet requires technologists to generalize, new categories of Internet specialists are emerging, said David Foote, an analyst at Meta Group.

Web workers are dividing into 14 categories of technical specialists on one side and content creators — who often have marketing backgrounds — on the other.

At The Charles Machine Works, Inc. in Perry, Okla., an understanding of business processes is already considered vital. Instead of hiring Internet specialists, the company trained and promoted internal staff.

"They'd rather take people who know the business and let them learn the technology," said Evan Luthye, an IS application developer at Charles Machine Works. "If someone came in here and said, 'I can write HTML. I want 50 grand a year,' they'd be laughed out of the office." □

UP FRONT

Hat trick

If you hate Microsoft, don't bother reading any further.

With last week's $1 billion investment in Comcast, Microsoft solidified its position as the force to beat in electronic commerce. The deal caps a remarkable run of investments Microsoft has made in services that target consumers — perhaps your customers. Having spent the past year pouring resources into travel, investing, local news and auto buying services, Microsoft now is investing in infrastructure. It's brilliant, it's unnerving and it will probably work.

Microsoft's yearlong venture into the "content" business has drawn the rap that the company doesn't understand publishing. For those who say that, I'd suggest a cruise through the Expedia travel service or Carpoint auto buying guide. They're slick, intuitive, reasonably comprehensive and free. They aren't necessarily the best, but they're good enough, and the Microsoft brand has enough equity to draw consumers in droves. And with $8 billion in cash still lying around, the company is extraordinarily well-positioned to place calculated bets for a long time.

The Microsoft brand has enough equity to draw consumers in droves.

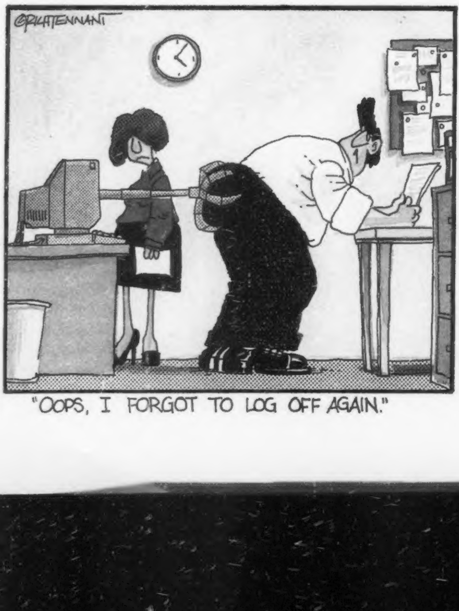
That's what makes the Comcast deal so scarily smart. With cable modems showing promise to be the killer app of Internet infrastructure, Microsoft is preparing to reach its hand into every aspect of the consumer's interaction with the Internet. It'll have a stake in your link to the Web (Comcast, WebTV and Bill Gates' Teledesic investment), your personal start page (Internet Explorer) and links to information and shopping services: an electronic-commerce hat trick.

It was ironic that Microsoft's investment in the cable guys last week coincided with IBM's move to kill World Avenue, its lifeless online shopping mall. World Avenue died because it tried to re-create bricks and mortar in cyberspace. Microsoft is succeeding because it's doing the opposite: building the foundation for a new kind of commerce. This company gets it. Like it or not.

Paul Gillin, *Editor*
Internet: *paul_gillin@cw.com*

THE FIFTH WAVE

BY RICH TENNANT



"OOPS, I FORGOT TO LOG OFF AGAIN."

E-mail Rich Tennant at the5wave@tiac.net

Netscape to post fix for browser bug

▸ *Bug catcher alleged to squeeze company for bigger bounty*

By Mitch Wagner, Stewart Deck and Sharon Machlis

NETSCAPE COMMUNICATIONS Corp. late Friday announced a bug fix for a security hole in its browsers that lets webmasters under certain circumstances read any file on the hard disk of any user connected to their World Wide Web sites. The fix will be posted to Netscape's Web site early this week *(www.netscape.com)*.

Several security consultants and the company downplayed the bug's impact. A spokeswoman noted that it affects all versions of its Navigator browser stretching back a year and half and that no one had discovered the bug until last week.

The Danish consultant who found the bug — Christian Orellana, 28, of Cabocomm Co. in Aarhus, Denmark — said the full file name and directory of a file are needed to exploit the bug.

HIGHEST BIDDER?

Netscape has long had an open offer of $1,000 and a free T-shirt to anyone who discovers a bug in its browsers. But Netscape claims that Orellana threatened to take his information to another bidder unless the company ponied up more than $1,000.

Netscape officials said that while waiting on Orellana, its own developers and consultants were able to reproduce the bug.

Netscape gave *Computerworld* a copy of an electronic-mail message allegedly sent by Orellana that said in part: "I think the person most suited for handling this, is someone in charge of the company check book (-;."

Orellana denied holding the bug fix hostage. He said he would have been willing to give the information to Netscape today for whatever it thought was fair — even for free.

He said he thinks his efforts are worth more than $1,000 and Netscape should expand its bounty program.

Orellana took his story to CNN, which reported the bug Thursday. CNN officials said he successfully demonstrated the bug. Orellana declined to reproduce the demo for *Computerworld* late Thursday. □

New Reader's Digest CIO a real data mining buff

By Thomas Hoffman

DAVID H. STARR, the congenial chief information officer at New York-based ITT Corp., has bolted for greener pastures — literally and figuratively — by joining The Reader's Digest Association, Inc. as its top technology honcho.

Starr gave several reasons for the switch: a shorter, more scenic commute to Reader's Digest's Pleasantville, N.Y., headquarters from his home in Ridgefield, Conn., and an opportunity to get out from under ITT's defense wing, one of three divisions run by ITT in addition to its financial services and hospitality businesses.

Said Starr, 46, "I was tired of being a death merchant."

BROADER VISTAS

But the biggest motivator was an opportunity to "push the edge" on a massive data warehouse at Reader's Digest that contains detailed information on 77 million households worldwide packed into eight Storage Technology Corp. silos that make its data center "look like NASA," Starr said.

Reader's Digest "has been exploring a lot of sophisticated data mining techniques and, well, I'm a real data mining buff," said Starr, who will tour the firm's data center in the U.K. this week after just 10 days on the job.

New CIO wants to "push the edge"

Starr said he hopes to beef up Reader's Digest's data analysis capabilities by developing more robust data mining tools for marketing representatives to use to ferret out potential customers for its gardening and other publications.

Most of those mining tools will have to be developed in-house, Starr said, because few third-party applications are powerful enough to churn out such granular information.

Already, Starr has been captivated by Reader's Digest, whose tony headquarters is protected like Fort Knox. When Starr first visited this spring, he was stunned by the company's ironclad security. "I thought ITT had a lot of security with its defense business, but [Reader's Digest's security] blew it away," he said.

Starr later learned that the publishing company's headquarters houses a massive collection of priceless art by Picasso, Matisse and other painters. "That explained the tight security — it's an awesome collection," Starr said.

He will help them store their other gems. □

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Playing in the *Computerworld* Broadcast Center this week: *(www.computerworld.com/cbc)*:

- **FAULTY TRANSMISSIONS: *Car Talk*'s Click and Clack offer tips on how to parlay an MIT education into a career in auto repair. In Profiles, on Monday.**
- **SPAMFORD SPEAKS: Sanford Wallace, the self-acknowledged King of Spam, defends himself and his company. In Profiles, on Monday.**
- **FATAL ATTRACTION: Is the road to hell paved by power users? Harvard professor Clayton Christensen discusses the dangers of technolust. In Managing, on Tuesday.**
- **LET'S HAVE FUN: Office water fights, hallway chair races, karaoke — IS live-wire Jeanne Simia shares her tips for keeping things loose at work. In Managing, on Thursday.**

SAP to add data warehouse

▸ *R/3 system will allow queries from desktops*

By Randy Weston
AMSTERDAM

GERMAN SOFTWARE giant SAP AG last week unveiled a plan to embed data warehousing capabilities in its flagship R/3 business process software system.

The announcement, made before 5,200 attendees at the Sapphire European user group conference, means companies that organize their businesses around the R/3 system will be able to add data warehouse queries to their end users' desktops, SAP officials said.

The data warehouse is scheduled for early release in October and general release next March.

Highlights of SAP's data warehouse

- **Built as separate component linked to transactional processor by application link enabling technology.**
- **Preconfigured with business processes included in R/3.**
- **Deployed as a central repository or at multiple locations.**
- **Contains a staging layer for automated data extraction and loading into the data warehouse from R/3 or other applications.**

SAP plans a demonstration in August at the U.S. user group conference in Orlando, Fla.

European SAP users said they were interested in getting prebuilt data warehouse capabilities with their R/3 systems, but they need to see the technology in action.

John Lawrence, who runs the management systems at Dutch oil giant Shell International Exploration and Production BV in The Hague, said his company will delay a decision until after the conference in Orlando.

"If they build it according to sound principles, then it will be worthwhile," Lawrence said. "We would much rather buy a solution than build one."

Lawrence said SAP would need to make sure the transaction processing in R/3 stays separate from the analytical processing required by a data warehouse. Also, he said, the package would need to replicate data warehouse information between his headquarters and remote offices.

So far, SAP officials said, the company plans to include that kind of functionality in its embedded data warehouse.

SAP is building the warehouse so it can be ported to earlier versions of R/3, including Versions 3.0 and 3.1. It will also link to other software systems so data can be extracted from point-of-sale data management applications or products from Oracle Corp. or The Baan Co.

Jim Shepherd, an analyst at Advanced Manufacturing Resources, Inc. in Boston, said it makes sense for an application vendor such as SAP to take on the online analytical processing and data warehousing market.

"To have a data warehouse coming from an application vendor means users won't have to build a data warehouse. They won't have to consolidate and rewrite all those thousands of standard reports that they currently do," Shepherd said.

Using the estimate by Meta Group, Inc. in Stamford, Conn., that it takes 18 to 36 months to build a data warehouse, SAP officials said they expect their embedded functionality to cut that time by 60% or more.

But that labor-saving claim isn't slowing Pirelli SpA from going ahead with its own data warehousing project.

Arrigo Andreoni, director of information systems at the Milan, Italy-based tire maker, said although his company is standardizing its international operations on R/3, SAP is too late with its data warehouse. Pirelli is too heavily invested in building its own warehouse at a test site using a system from Business Objects SA in San Jose, Calif., Andreoni said. □

ON THE HUMOROUS SIDE

CHRIS HARTLOVE

STRESSFUL TIMES call for drastic measures at the office. Learn how some information systems organizations use humor and hijinks regularly as elixirs. **Managing**, page 75

CLICK AND CLACK TAPPET, also known as Ray (left) and Tom Magliozzi, host NPR's *Car Talk*. Editor Paul Gillin went to the MIT grads seeking parallels between information technology and automobile repair. He was forced to settle for insults, wisecracks and a dissertation on college mixers. **In Depth**, page 97

RICHARD HOWARD

Oracle puts Sedona on back burner

By Craig Stedman
REDWOOD SHORES, CALIF.

ORACLE CORP.'s much-hyped Sedona object development tool is in deep limbo and appears unlikely to materialize as a full-fledged product.

Sedona has been in beta testing since January, and Oracle was supposed to start limited shipments of it next month. It had been positioned as a key piece of Oracle's network computing architecture and an important companion to the object-enabled Oracle8 database, which will be released next week.

But Oracle Chairman Larry Ellison at an Oracle8 briefing here said he put Sedona on hold after the company's in-house programmers balked at using the tool.

"It would be silly for us to release a new tool that competes with our existing ones when our own application development team isn't signed up," Ellison said. "We have to have a unified strategy or we'll confuse the hell out of the market."

MISSING FEATURES

The applications group complained about missing features, such as a lack of Java support, after getting hold of the latest version of Sedona, Ellison said. As a result, the object tool has reverted to being "a work in progress, and I honestly can't tell you when it will be done," he said.

Oracle8 beta tester Richard Adelson said Oracle officials have started describing Sedona as a collection of technologies that could be embedded in other products rather than as a stand-alone tool.

"Obviously, there's a little dissension internally, but I think [Ellison] did the right thing," said Adelson, enterprise architect at The Hartford insurance company in Hartford, Conn. "They've never been very definite about where they were going to fit Sedona in, and now they're going to be forced to be much more crisp about the strategy."

Oracle officials had described Sedona as the firm's next-generation development environment, but it lost some strategic luster this year after Oracle announced plans to add object support to its Developer/2000 and Designer/2000 tools.

Sedona was supposed to include these components:

- Database-neutral visual development tools
- Repository for storing multiple types of objects
- Middleware for distributing objects across networks
- Support for multiple programming languages
- Tools for modeling and testing object functionality

Even so, observers expected Sedona to play a key network computing role as a tool for building add-on modules that could plug in to Oracle8 or application servers.

The problems with Sedona involve its front-end tools for building application screens and graphical user interfaces rather than its object repository and middleware pieces, Oracle sources said.

Praveen Rao, director of interactive and information systems engineering at Time Warner, Inc.'s cable TV unit in Maitland, Fla., asked for a beta copy of Sedona earlier this spring. "But they said we were too late, and now I guess I know why," Rao said. □

Oracle8 upgrade coming soon – but with a catch

By Craig Stedman
REDWOOD SHORES, CALIF.

FOR A CHANGE, users of Oracle Corp.'s applications won't have to wait from here to eternity before they can upgrade to the new Oracle8 database.

But there is one catch: That applies only to customers who migrate to the Oracle Applications 10.7 release that became available in February.

Users of Oracle Applications 10.7 will get cleared for takeoff with Oracle8 within a week or two after the database is formally launched June 24, Oracle officials said last week. The company previously took six months or more to certify its applications on new databases.

The certification process was especially slow for Oracle7.3, the last major database upgrade. It was released in February 1996 but didn't get the seal of approval from Oracle's applications group until this February — a wait that left users chafing [CW, Jan. 20].

USER HEAT

"They got a lot of heat from the user community on that," said Michael Prince, chief information officer at Burlington Coat Factory Warehouse Corp. in Burlington, N.J. He said such piecemeal releases complicate "the matrix of things that have to be accomplished before you can upgrade to a new database."

That won't be the case with Oracle8 — but only for users who are ready to make the jump to Oracle Applications 10.7. That is the only applications release that will get year 2000 compliance [CW, April 14], and company officials said it also is the only one being certified for Oracle8.

DELIVERY TIME FOR ORACLE

Product	Availability
Oracle8 Version 8.0	June 24
Oracle Applications 10.7 with support for Oracle8	July
Developer/2000 tool with support for Oracle8 objects	Second half of this year
Object Database Designer modeling tool for Oracle8	Second half of this year
Oracle8 Version 8.1 with server-based Java support	Developer's kit late this year; general release expected next year

The need to get with the 10.7 program "does make upgrades harder, but it's typical of what people have to face every day," Prince said. Burlington Coat is converting an initial finance application to 10.7 now and expects to move to Oracle8 in the fall.

Nancy Lane, manager of financial systems at Bechtel Corp.'s government contracting unit in San Francisco, said certifying earlier applications releases with Oracle8 would have been "a waste of development resources," because Oracle is actively prodding users toward Version 10.7.

Oracle8, which was first discussed by Oracle officials five years ago, is supposed to provide mainframe-like transaction processing capabilities, including improved scaling in terms of both data and end users. The new database also adds data warehousing features and initial support for object technology.

Ken Jacobs, vice president of product strategy at Oracle, said the drawn-out Oracle7.3 certification process was "embarrassing," especially because SAP AG released its rival R/3 software on that database before Oracle's own applications became available.

Oracle changed its internal development procedures to ensure that a repeat wouldn't happen, Jacobs said during an Oracle8 briefing at company headquarters here. ☐

IBM aims to speed up AS/400 recovery time

By Tim Ouellette
DALLAS

IBM WANTS TO harden up the soft underbelly in the AS/400's availability features.

The AS/400 is well-known as a reliable machine that rarely fails. But when the midrange platform does crash, it is vulnerable to long delays in restarting the system — valuable time for a platform that many midsize sites depend on to run their businesses.

"AS/400 is a very reliable platform. But when it takes a hit for downtime, you are normally out for a long time," said Donna Scott, an analyst at Gartner Group, Inc. in Stamford, Conn.

Windows NT and Unix servers fail more often than AS/400s but can recover more quickly, Scott said.

Part of the problem is that the AS/400's integrated architecture, with storage tightly tied to the system, makes recovery a slow process. Most failures are tied to the disk subsystem or power outages, Scott said.

FOUR DAYS DOWN

A user at last week's AS/400 Environment conference in Dallas said a recent storm caused a 12-hour power outage at her firm, resulting in 96 hours of downtime when two mirrored AS/400s failed.

Bill Zeitler, general manager of the AS/400 division, told the conference's 390 attendees that IBM will improve the system's availability.

To do that, IBM plans to streamline the internal workings of the AS/400 to speed up recovery times by up to 60%. IBM also pledged to improve the way users can perform maintenance without downtime, build an AS/400 clustering infrastructure and add clustering capabilities to the OS/400 operating system.

TOWARD SYSPLEX

Although AS/400 clusters have existed since 1990, "we will move to something more closely aligned with IBM's [high-end, mainframe] parallel sysplex technology," Zeitler said.

That means AS/400 clusters will gain more of the structured, organized way mainframes divide up application processing among one another rather than mirror what is on each machine.

And any new clustering scheme won't require users to alter their applications, Zeitler said. Mainframe users now must tweak their programs to run effectively in a parallel sysplex cluster.

UP ALL THE TIME

Although about 40% of the 425,000 AS/400s installed are single systems in a company, users may begin to move more to a reliable clustering scheme to keep applications available all the time, according to Gartner research.

Gartner expects the market for AS/400 availability clusters to grow by at least 75% in the next two years.

In the near term, some users have turned to cross-platform systems management software for preventive management. That is important as the AS/400 begins to play a more important and integrated part in the rest of a company's multiplatform computer operations, instead of standing alone.

"It is important for us to isolate and analyze [AS/400] problems in a distributed environment, which we weren't able to do before," said Lars Carlasjo, an information systems manager at SKF DataService AB in Sweden. ☐

Industry floods feds with privacy pitches

By Sharon Machlis and Mindy Blodgett

THE COMPUTER industry last week flooded the Federal Trade Commission (FTC) with multiple Internet privacy proposals they hope will show that the industry can regulate itself.

Microsoft Corp. said it will join rival Netscape Communications Corp. and about 60 other vendors to develop a standard for storing personal information in an individual's World Wide Web browser. Users then could decide whether to grant a Web site permission to collect all or some of that data.

"The obstacle isn't technical as much as convention," said Josh Bernoff, a senior analyst at Forrester Research, Inc. in Cambridge, Mass.

The Open Profiling Standard (OPS) was announced several weeks ago as a project to be submitted to the World Wide Web Consortium in Cambridge, Mass. The addition of Microsoft makes it much more likely that the resulting protocols will become an industry standard.

Company officials said OPS products are probably 12 to 18 months away.

"I don't know which I feel more comfortable with, the federal government or Microsoft setting the standard," said Chris Pizey, webmaster at the Universal Press Syndicate in Kansas City, Mo. "I think in a year, Microsoft will own the Internet. . . . So it is likely they will set the privacy standard, and that is just the way it will be."

Eight database services announced they won't add consumer marketing data such as names, addresses and Social Security numbers.

Tracking Web visitors "is an extremely important and valuable aspect of the Internet vs. other mainstream media," Pizey said. "[But] if people don't feel comfortable about using the Internet, it could defeat things like electronic commerce."

The World Wide Web Consortium, which oversees Web technical standards, unveiled another project at the FTC's privacy hearings last week. The Platform for Privacy Preferences (P3) would standardize the way Web sites describe their policies on handling personal data they collect and let users decide how much data they want to give. OPS then could be used to implement the data exchange.

The FTC held the hearings to consider whether federal regulations are needed to safeguard privacy on the Internet.

Privacy advocates say Internet users today have little control over data they turn over to Web sites and no way to know how that information is used.

A study released last week by the Electronic Privacy Information Center in Washington found that only 17 of 100 popular Web sites have privacy policies, and none met what the center considers "basic standards for privacy protection." Only one site let users access information in their own file and revise it. ☐

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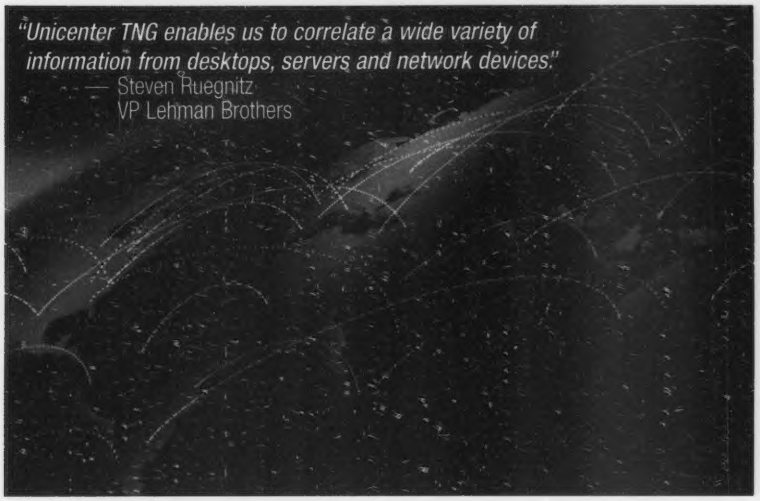

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— Steven Ruegnitz
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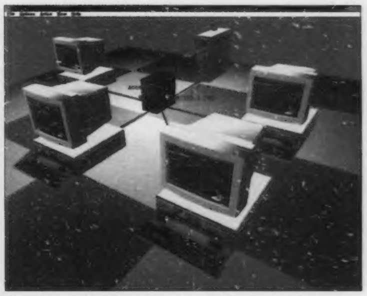

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NETSCAPE DEVELOPERS' CONFERENCE

A lull in Netscape/Microsoft war

▸ *Companies agree to follow standards in Internet development efforts*

By Barb Cole-Gomolski
San Jose, Calif.

MUCH TO THE relief of many of its users, Netscape appears to be moving closer to a truce with its arch nemesis, Microsoft Corp.

Netscape Communications Corp. last week posted an "Open Standards Guarantee" on its World Wide Web site in which it pledged to adopt any standards set by the Internet Engineering Task Force or other standards body, regardless of the source of the technology.

Microsoft, in turn, surprised many by agreeing to support an Internet privacy plan proposed by Netscape and other vendors in May.

COMPATIBILITY ISSUES

Both pronouncements were good news for users gathered here last week for Netscape's Internet Developers' Conference.

In interviews, many said they feared that the ongoing rivalry between the two browser leaders could result in incompatibilities that will make it hard to deploy Web applications in mixed environments.

"It would be great if they could cooperate," said Glenn Newell, senior engineering manager of intranet technology at National Semiconductor Corp., in Santa Clara, Calif., which has standardized on Netscape's browser. "Some of our key systems rely on these Internet protocols, and we'd like to be assured that these large companies are on the same page."

The two vendors have a way to go.

'NET RIVALS

Microsoft and Netscape don't see eye to eye on all Internet standards

Where they agree

- **LDAP directories**
- **IMAP mail services**
- **Internet privacy**

Where they disagree

- **Objects**
- **Dynamic HTML**

Users also are concerned about the companies' different object strategies. Netscape supports Java and the Object Management Group's Common Object Request Broker Architecture. Microsoft is pushing ActiveX, its own object-oriented technology.

If the two continue on separate object paths, it is unlikely that sites will be able to deploy distributed applications in an environment that includes Web servers from Microsoft and Netscape, users said.

Other concerns cited include a lack of support for ActiveX components in the Netscape Crossware application framework and the divergence in the companies' implementations of Hypertext Markup Language.

"We moved toward the browser environment because it was a standard," said John Kay, manager of electronic commerce at Chrysler Corp. in Dearborn, Mich., which uses Netscape browsers and Web servers. "I don't want to have to tell a supplier [of ours] to go out and get Netscape's browser because Microsoft's [browser] isn't compatible."

Several users said they picked Netscape's products because they support open standards.

But if Netscape products don't work with Microsoft offerings — many of which are de facto standards — users will nonetheless face an interoperability issue.

"We use Netscape's browser and Microsoft's applications, and we have no desire to standardize on one vendor's platform," said David Burke, director of communications and client support at Kindercare Learning Centers, Inc. in Montgomery, Ala.

David Folger, an analyst at Meta Group, Inc., in Burlingame, Calif., said a detente could only help Netscape.

Efforts to reach Microsoft were unsuccessful. □

Users applaud vendors' interoperability promise

By Mitch Wagner
San Jose, Calif.

WORLD WIDE WEB developers at a Netscape Communications Corp. conference here last week cheered the company's announcements of cross-platform technologies for linking legacy data stores and the Internet.

Felix Gushansky, senior software engineer at Marshall Industries in El Monte, Calif., wants to link a wide variety of legacy mainframe, Unix and desktop systems in a supply-chain network. "This kind of technology will be a big help to us in doing that," he said.

Netscape, along with IBM, Oracle Corp. and Sun Microsystems, Inc., last week announced plans to strengthen ties between JavaBeans — a Java-based architecture for linking applications — and the Common Object Request Broker Architecture (CORBA), which is middleware for client/server communication.

By using a combination of JavaBeans and CORBA, information in various legacy systems can be retrieved by users on the Internet.

Netscape said its Visual JavaScript tool kit will support CORBA, beginning this week. That means the drag-and-drop application builder will be able to use the Internet to seamlessly link programs written in Hypertext Markup Language, Java and other languages across multiple platforms.

Visual JavaScript, currently in open beta testing, can be downloaded from Netscape's Web site *(www.netscape.com)*.

Netscape expects the product to be generally available in August.

JAVABEANS SERVICES

Also, in the new version of Netscape's Web and collaboration servers, all services will be addressable as JavaBeans.

That makes it easier for developers to build applications incorporating functions such as Web publishing, document management, groupware and electronic mail. The new versions shipped last week.

The four companies also agreed to submit a specification for JavaBeans and CORBA compatibility to the Object Management Group, for possible adoption as a vendor-neutral standard.

The announcement builds on statements the vendors made this year supporting CORBA [CW, March 17] and Sun's promise to marry Java-

Netscape's activities at its developers' conference

- **Shipped Communicator 4.0, a combined browser and client for groupware, scheduling and messaging**
- **Shipped new versions of servers, featuring improved document management**
- **Announced an alliance with Novell to offer training programs in Internet technology**

• Using Portola Communications technology

Netscape scales Messaging Server

By Barb Cole-Gomolski
San Jose, Calif.

NETSCAPE communications corp. is readying its next-generation messaging server, which will boost scalability and offer improved management features, company officials said last week.

INTERNET COMMUNICATION

Netscape officials said the next version of Messaging Server will support thousands of users per box when it ships in the first half of next year. It will be part of Apollo, the next release of the SuiteSpot bundle, which includes nine World Wide Web and collaboration servers.

Scalability has become a hot issue for messaging servers because it impacts users' IS ownership costs. Indeed, users have criticized Microsoft Corp.'s Exchange and Lotus Development Corp.'s Notes for those products' scalability shortcomings. Today, users typically run a few hundred users on a Notes or Exchange server.

The upgraded Messaging Server will include technology Netscape acquired when it recently bought out Portola Communications, a small messaging company in Palo Alto, Calif.

The technology consists of algorithms that can improve the throughput of Internet Message Access Protocol-based systems, said Ben Horowitz, director of server product marketing at Netscape.

Netscape's current messaging product — Messaging Server 3.0 — shipped last week as part of SuiteSpot 3.0 and is being offered as an enterprise-scale mail server. But with the Apollo release, the software will be much more scalable, Horowitz said.

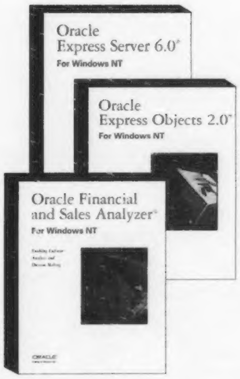
The Apollo Messaging Server also will have a revamped administrator's interface and new tools to handle message tracking, he said. By the time the Apollo Messaging Server is ready, Microsoft is expected to have shipped Osmium, a more scalable version of Exchange, and Lotus will have released its Domino 5.0 upgrade.

Although Netscape is considered an upstart in the electronic-mail space, its strategy to build a mail server based on Internet protocols resonates with users.

At the company's Internet Developers' Conference here last week, attendees packed a session on Netscape's mail offerings.

"We do see the Web as the way to go in the mail area, and Netscape does have a leg up in that area," said David Thompson, an analyst in the advanced technologies group at BellSouth in Birmingham, Ala.

The company is seeking to move 40,000 users from Hewlett-Packard Co. OpenMail and is considering Netscape's offering. □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Unauthorized software means headaches for IS

By Lisa Picarille

IS MANAGERS looking to tighten their control over the software installed on users' desktops must contend with users who want to exploit the wealth of free applications downloadable from the Internet.

Although user installation of nonsanctioned software is nothing new, increased use of the Internet and a proliferation of software-related sites on the World Wide Web has made it easier to find, access and install a wide array of software.

"This is not a handful of people downloading a screen saver," said Jeffrey Tarter, editor of "Softletter," an industry newsletter in Watertown, Mass. "This is hundreds of thousands of users dealing with things that can cause major tech-support headaches. Anyone worried about controlling what software sits on users desktops is looking at a nightmare."

SOFTWARE JUNKIES

"I think if I really knew just how much junk some users downloaded, I would have a heart attack," said an information systems director at a large West Coast biotechnology company, who asked not to be identified. "These users are also the first ones to come crying when they have system conflicts. We need to address this before it gets out of hand."

The most popular applications available on the Web share attractive characteristics. Most are free, have small memory requirements, offer functionality that appeals to individual users and often require only minimal technical adeptness to install.

> **"You've got to nip it in the bud by setting up an Internet access policy."**
> **– Carl Norman, Titleist and Foot-Joy**

And nearly every software developer has beta releases or trial versions of products on its Web site. Users also can go to a variety of sites, such as *www.shareware.com* or *www.download.com*, for a huge array of titles.

For example, in the week after it shipped, Save-It Software's ByteCatcherX ActiveX Control was downloaded 23,427 times. Users downloaded Microsoft Corp.'s Internet Explorer more than 31,000 times last week — even after 31 weeks on the site.

System utilities such as uninstallers, beta releases, components and antivirus software are also enormously popular.

Observers said there is no way, short of eliminating Internet access, to prevent users from downloading applications.

But there are several ways to deter them: Set clearly defined Internet access policies, outline specific standards for software installation and, if necessary, install software to monitor Internet use.

CATCH ABUSE EARLY

Carl Norman, Lotus Notes administrator at Fairhaven, Mass.-based sporting goods manufacturer Titleist and Foot-Joy Worldwide, likened Internet use policies to corporate rules on personal use of the telephone.

"You've got to nip it in the bud by setting up an Internet access policy and then, like using the telephone only for business, establish that someone is watching to make sure," said Norman, who keeps watch using the Web navigator feature of Notes, which provides detailed reports on users' Internet access. "Once you do that, I don't think the threat is that big."

Officials at some companies, such as Fireman's Fund Insurance Co., said they don't monitor Internet access and "trust employees to follow the rules."

"We have generic policies about bringing in unauthorized software for desktop PCs," said Bill Cox, lead systems engineer at the Novato, Calif., company. "There is nothing specific about downloading from the Internet. I know there are more opportunities, and the potential for problems is a disaster, but I'm not losing sleep over it." □

• IS spending up

Pressure is on to cut costs

By Thomas Hoffman

SPENDING ON information technology is up — and so is the pressure on chief information officers to reduce organizational costs through technology.

A study published this week by Carlsbad, Calif.-based Computer Economics, Inc., an information systems consulting firm, reveals that 57% of all IS departments in organizations with $100 million or more in revenue saw a boost in their budgets this year. Information about the report can be found at *computereconomics.com*.

A vibrant U.S. economy and a greater recognition of the competitive value of IT at the corporate board level are helping drive the rise in IT spending, according to industry analysts. But for CIOs on the front lines, fatter budgets often mean increased pressure to deliver cost savings and improve productivity.

"There might be marginal increases [in IS spending], but the onus is on [IS executives] to reduce operational costs," said Jon Fullinwider, CIO for Los Angeles County.

The county's IS budget will remain flat at about $450 million through at least next year and won't include any additional funding to help it combat its year 2000 programming problem, Fullinwider said.

Fullinwider has spearheaded a countywide telecommunications contract with Pacific Bell instead of having county departments negotiate individual rates, which are usually higher. "That's any vendor's tack — divide and conquer," he said.

UNDER PRESSURE

Fullinwider isn't alone. Skyway Freight Systems, Inc. saw its IS budget go up slightly this year but is still under pressure to use technology to improve productivity and slash costs wherever possible.

For example, Skyway's IS department is directing a $150,000 project to migrate its 35 customer service representatives from mainframe-based dumb terminals to Windows NT workstations. The NT workstations allow the representatives to perform various tasks simultaneously by opening up multiple windows during customer calls. That has helped the company improve productivity by roughly 50%.

The productivity increase negates the need to add an estimated 15 representatives this year to handle the additional volumes that come with the company's annual revenue growth of 25% to 30%, said Tom Duck, CIO at the Santa Cruz, Calif.-based shipping firm.

The system "should save each of our [customer service representatives] two hours a day in work and cut down on their dead time," Duck said. □

SHORTS

Hacker attack shuts agency site

The U.S. Foreign Agricultural Service shut down its World Wide Web site last week after a hacker allegedly used the system to launch attacks against other sites on the Internet. The agency received a complaint that its system was repeatedly sending out connection requests, a popular hacker technique to tie up a target system so it can't service other users. The agency, which is restoring the site and increasing security, found no damage to data on its computers.

Microsoft buys stake in Comcast

In a bid to integrate PCs with television, Microsoft Corp. last week invested $1 billion in return for an 11.5% stake in cable TV operator Comcast Corp. Microsoft plans to buy WebTV Networks, Inc. for similar reasons. Analysts said the pairing of Microsoft and Comcast will lead to fast cable Internet access and result in interactive television. "I suppose Comcast will use a great deal of WebTV and Microsoft technology to build the interactive network," said David Card, an analyst at International Data Corp. in Framingham, Mass.

3Com joins Fast Ethernet fray

3Com Corp. last week unveiled a Fast Ethernet switch with ports that can operate at either 10M or 100M bit/sec. That lets information systems managers handle rising bandwidth needs without replacing switches. The Santa Clara, Calif., vendor's SuperStack II Switch 3000 10/100 has 12 ports, costs $3,495 and ships this month, with Asynchronous Transfer Mode and Gigabit Ethernet uplinks due during the next three months.

IBM to ratchet up Token Ring

IBM officials last week said it is working on ways to enhance Token Ring LAN technology, still widely used in its shops. The Armonk, N.Y., vendor is working on a scheme to ratchet up Token Ring's speed from 16M to 100M bit/sec., according to a company spokesman. The spokesman said work is preliminary, but users should expect to hear more about the efforts shortly.

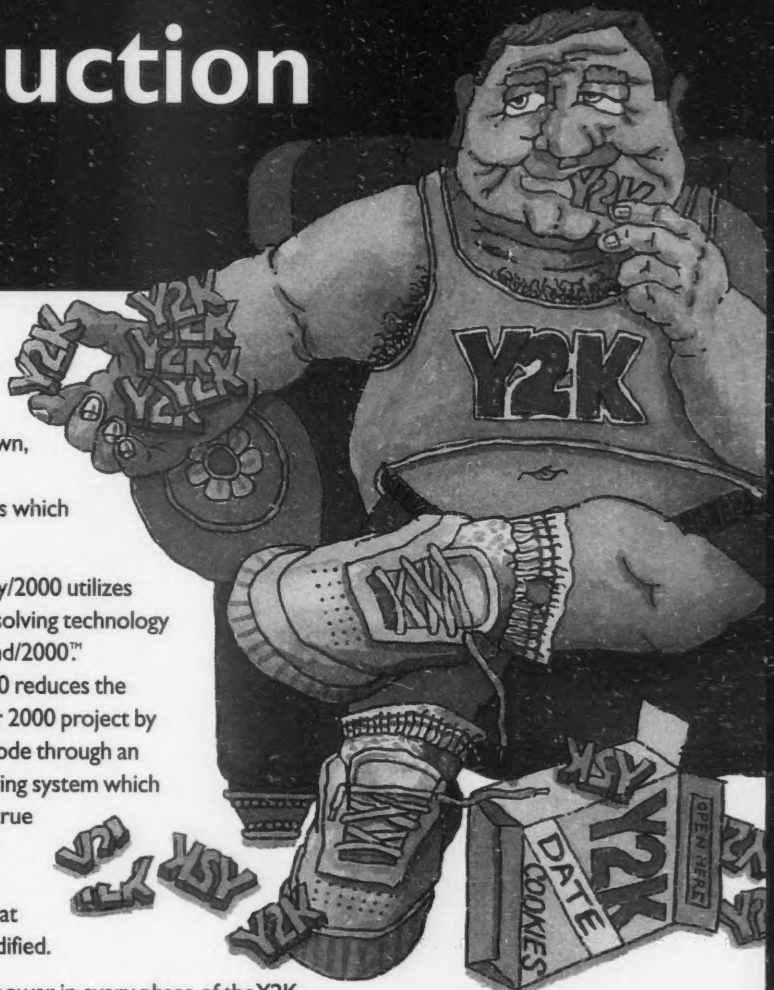
Intuit downsizes, invests

One day after announcing its plans to cut 9% of its workforce, Intuit, Inc. last week agreed to pay $40 million for a stake in Internet search firm Excite, Inc. in Mountain View, Calif. Intuit officials said the company plans to market its Quicken Financial Network to Excite's 2.5 million daily users. Redwood City, Calif.-based Intuit said its 270-job downsizing plan frees up money to reinvest in Internet services such as Excite.

Informix drops defectors lawsuit

Informix Software, Inc.'s much-publicized lawsuit against Oracle Corp. over the January defection of 13 Informix engineers turned out to be much ado about nothing. Informix, in Menlo Park, Calif., dropped the suit last week after deciding its trade secrets were adequately protected. Informix also said it "regrets any statements or allegations" charging the engineers with disclosing confidential information to Oracle.

SHORT TAKE Richard Thoman, IBM's chief financial officer, is moving to Palo Alto, Calif.-based Xerox Corp. to be president and chief operating officer. Thoman, 52, was credited by Wall Street watchers with resuscitating IBM's PC business.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Forget alignment, act like venture capitalists

▸ *Forum advises IS to focus on technology that makes money*

By Thomas Hoffman
SCOTTSDALE, ARIZ.

CIOS WHO WANT to remain information technology leaders are being advised to structure their departments more like venture capital firms and less like supply houses.

Like venture capitalists, information systems departments should seek innovative technologies that can be used to directly impact their organizations' bottom lines.

Yet today, most forward-moving organizations use IT to improve their productivity and for competitive positioning. The problem is that, with increasing frequency, IS departments are being bypassed on technology projects designed to generate new or increased revenue. That is because many IS groups have rigid structures and are viewed as obstacles to fast implementations.

That was the consensus of speakers and many attendees at last week's GigaWorld IT Forum '97 conference here, sponsored by Giga Information Group in Cambridge, Mass.

It is also a perception that IS executives are trying to come to terms with. "There's a stigma attached to IS that [IS executives] have to break through," said Jim Deis, manager of application development at the Federal Reserve Bank of Kansas City in Missouri.

Much emphasis in IS has been placed on aligning themselves with the needs of the business units they serve.

But as businesses keep changing themselves, alignment becomes harder to achieve. As such, speed "becomes more important than alignment," said David Gilmour, chief research officer at Giga.

CIOs "can't look back at success patterns. We have to formulate new strategies" to support business units.
– Patricia Wallington, CIO, Xerox Corp.

Many of the IS executives at the conference agreed. "This is exactly what we should be doing — providing utility-type services and using technology to go after new business opportunities," said Jack E. Ewers, manager of business systems at Honeywell, Inc.'s Space Systems Division in Clearwater, Fla.

CONSTANT CHANGE

To survive in the current business climate, chief information officers need to learn how to manage constant technological and business changes, said Patricia M. Wallington, vice president and CIO at Xerox Corp. in Stamford, Conn.

To that end, the past is prologue. "We can't look back at [previous] success patterns" because they don't apply to current projects and corporate business models, Wallington said.

"We have to formulate new strategies" to move our organizations forward, she said.

Wallington speaks from experience. In the early 1990s, she and her staff implemented a standards-based infrastructure for Xerox called IM 2000.

Xerox's previous IT infrastructure "was dearly loved by everyone," and there was "a lot of moaning and groaning" by skeptical users about the new architecture, she said.

Shortly after Xerox outsourced the deployment and management of IM 2000 to Electronic Data Systems Corp. in 1994, Xerox salespeople began to recognize they could gather more useful information about the products they were selling. Eventually, the IM 2000 infrastructure was well-received, Wallington said. □

ActiveX gets security boost

▸ *Microsoft adds time-stamping to Authenticode*

By Sharon Gaudin
and Sharon Machlis

MICROSOFT CORP. is upgrading its security model for ActiveX to extend the life of ActiveX controls. That means users should update their Internet Explorer browser software if they want to download ActiveX controls after June 30.

The software update, Authenticode 2.0, will be available from the Microsoft World Wide Web site at *www.microsoft.com/ie/security/authent.htm*. The other alternative: Surfers can simply turn off the older Authenticode screening in their browsers to download any controls they encounter.

Authenticode allows an ActiveX control to be digitally signed, so Web surfers can decide if they trust its author before downloading code to their machines. The older version allowed signatures to be valid for only a year, meaning the control had to be verified annually.

Version 2.0 incorporates time-stamping. Once code is signed, the signature on that specific control is valid indefinitely.

David Schrier, director of product development at Black Diamond Consulting, Inc. in Portsmouth, N.H., has already downloaded the latest version of Authenticode. He said ActiveX security isn't where it should be, but it is on the way.

"ActiveX was sort of a rush job," Schrier said. "It was always sort of inelegant in that the control would expire every year. I can understand my certificate expiring, but the fact that the life of my software is only a year is hard to take."

MORE SECURITY NEEDED

Schrier said the time stamp will extend the life of his software, but he said he would like to see more security. "As soon as they try to come after the person on the certificate, they can be gone," he said.

The new version of Authenticode will eventually include the ability to revoke a certificate if an author is found to have written malicious code. That will be implemented with Microsoft's Internet Explorer 4.0, expected in beta version within four to six weeks.

Some users remain uncomfortable with the ActiveX security structure.

"You're still on the honor system," said Patrick Connolly, vice president of the Internet platform and tools group at Natural Applications Corp., a consulting and freelance development firm in San Francisco. "Someone can still be a jerk and go out there and get a certificate and do bad things."

MORE ABOUT ACTIVEX

ActiveX is a powerful software component architecture — a souped-up, Internet-enabled offshoot of its original desktop architecture OLE. ActiveX controls are small programs that can be downloaded across the Internet and run within a browser.

Microsoft has taken a lot of heat because ActiveX controls lack the built-in security of Sun Microsystems, Inc.'s Java. The controls sit directly on the operating system, giving them access to basic computer functions.

That is unlike Java's "sandbox" approach, which limits what downloaded code can access. A hostile control would have the access to delete files or shut down an entire system. ☐

How Authenticode 2.0 ActiveX Security works

- ActiveX author gets a digital certificate to sign his or her control
- Certificates are valid for one year; once a control is signed, it's valid indefinitely
- Users decide if they want to download the ActiveX control based on who signed it

Low-end storage software beats file servers on price

By Matt Hamblen
SAN FRANCISCO

MAYBE YOU DON'T have to buy another file server after all. Mylex Corp. in Fremont, Calif., will soon announce software that manages network storage devices at a cost that is about 90% less than buying a file server.

The low-end network storage software, now called NetEngine, will be bundled with hard drives sold by other vendors.

At the Network Storage '97 conference here last week, company officials said the product will be formally announced in about a month and have a price tag of less than $1,000.

Analysts and users said the Mylex product and forthcoming products from competitors will give users new options for providing inexpensive storage to small workgroups, such as branch offices.

SIMILAR FUNCTIONS

NetEngine is expected to provide the same functions as a network-attached file server, which typically costs $10,000 or more, analysts said.

With low-end storage management software, workgroup members can distribute and control access to the data stored on network-attached hard drives and monitor the function of the drives.

Meanwhile, Axis Communications, Inc. in Lund, Sweden, last week announced three products that let users attach the popular Iomega Corp. Jaz drives to a workgroup network.

Pricing for the Axis StorPoint HD starts at $999. StorPoint HD/4 Jaz is priced at $2,999 for a box containing a network interface and bays for four 1G-byte Jaz hard disks.

"I'm really excited about [NetEngine]," said David Blakley, computer systems manager at Genencor International, Inc., a biotechnology company in Palo Alto, Calif. Blakley recently spent $1 million to upgrade the network for the company's technology center and plans to beta-test NetEngine soon.

"I put in probably too much storage hardware, now that [Mylex] has come up with this product," Blakley said. End users on his 180-node network analyze digital snapshots of DNA cells — about 1.5M bytes per image — that must be stored for up to 24 months.

Mylex officials said NetEngine is ideal for users managing 10G to 30G bytes of storage.

The product isn't suited for enterprisewide storage needs, but "it's got a potential [use] in one of our 86 remote offices," said Robert L. Eads, chief information officer at American Protective Services, Inc. in Oakland, Calif. ☐

IBM gives Java cross-platform company

CONTINUED FROM COVER 1

signed to translate Smalltalk and Basic coding, as well as Java. IBM is slated to roll out UVM in the fourth quarter, according to Robert LeBlanc, director of IBM's Toronto laboratory, which has been working on UVM.

"This will help all those people who don't want to learn Java but already know Smalltalk or Basic. And Java isn't an easy language to learn, especially for developers who aren't familiar with object-oriented programming," said Karen Boucher, director of The Standish Group International, Inc. in Dennis, Mass.

Several users said they need to build cross-platform applications, but Java doesn't fit the bill for every project. They said they hope UVM will provide more of a choice.

"Sometimes I need to write in Basic. Sometimes I need to write in Java. I almost always need to write cross-platform," said Jean-Pierre Cabanie, computer support manager at Philips Microwave, a division of Philips Semiconductor in Limeil, France. "I cannot satisfy the needs of all my users with one language. It's quite vital."

SHARE THE SPOTLIGHT

Built around Java's platform-independent technology, the introduction of UVM would mean Java may have to share some of the cross-platform limelight that has made it one of the industry's hottest technologies. Some users wondered if that would mean competition for Java, but industry observers generally agreed that building more cross-platform applications would only benefit Java and its cross-platform push — especially because the UVM technology is built with Java.

Support for cross-platform computing has made Java, which is an object-oriented language focused on the Internet, the fastest-growing language on the market. Information systems managers have turned to Java because most companies have a heterogeneous environment that might include Unix, Windows or Macintosh machines. Building platform-independent applications keeps developers from having to port them, which can be a painful process, or rewriting an endless sea of code.

Joseph Feiman, manager of advanced technology at Cleveland-based American Greetings, said UVM could benefit developers and IS managers.

"Java has attracted so much attention because it can run on all these platforms, but the stability and maturity isn't there yet," Feiman said. "Smalltalk is more than 20 years old. It's mature. It's stable. For Smalltalk programmers, this could mean a second life."

But Evan Quinn, an analyst at International Data Corp. in Framingham, Mass., warned that the benefits of UVM could be lost if IBM doesn't remember the lessons of some of its former technological breakthroughs.

"They need to keep it simple and lightweight," Quinn said. "They don't need another OpenDoc, that's for sure. It needs to be fast and easy." ☐

IBM's Universal Virtual Machine

Development languages supported

- VisualAge for Smalltalk
- VisualAge for Java
- VisualAge for Basic

Operating systems to be supported

- AIX
- Solaris
- HP-UX
- OS/2
- Windows 95
- Windows NT

Availability

- Q4 1997

& **RAD Java tools could be a boon for application developers. Page 57**

PUSH
CAUTION

Home Depot's Brad Albers: "Network management is still a challenge"

Valley Children's Hospital's Dave Bates: "We are driving to expand to rural communities"

OSU's J. L. Albert: "[Advanced] network management will be our salvation"

PHOTOS BY SETH AFFOUMADO

Net management top worry

▸ *Users also cite bandwidth needs and remote access issues*

By Bob Wallace
SAN FRANCISCO

ON THE EVE of the $8.5 billion merger of 3Com Corp. and remote access giant U.S. Robotics, the networking industry's largest deal ever, most customers at 3Com's user group meeting last week were talking about network management.

In a poll conducted by 3Com prior to the meeting, 52% of the roughly 400 users pointed to network management as their largest information technology concern this year, 32% cited the need to boost bandwidth, and 15% worried most about adding remote sites.

MAJOR CONCERN

Attendees said their networks are expanding rapidly and becoming more instrumental in business success — making good management critical.

Network management "is a major concern for all users, and that's because no one vendor can provide everything we need," said Rob McKenna, vice president of global network engineering at Sumitomo Bank Capital Markets, Inc. in New York and president of the 3Com user group. The firm uses multiple systems to manage its network. "We're looking for better integration between network management [systems]," he said.

3Com has "made great strides in network management, especially in integrating remote monitoring capabilities [into its Transcend management application]," said Skip MacAskill, an analyst at Gartner Group, Inc., a research and consulting company in Stamford, Conn.

"They certainly haven't fallen behind. It's more a case of users' demands of their vendors increasing exponentially," he said.

Brad Albers' biggest network management challenge is how to keep a handle on his company's nationwide LANs and WANs.

Albers, senior manager of information services at The Home Depot, Inc. in Atlanta, wants to be able to better manage network expansion. His company currently has 535 stores and opens a new one every four days.

"We have superior network services staff, but network management is still a challenge," Albers said.

MANAGING EXPANSION

That also is the case for Dave Bates, assistant vice president and chief information officer at Valley Children's Hospital in Gettysburg/Fresno, Calif. Bates has to make the network keep up with expansion driven by increasing competition in the health care industry.

"Managed health care has come like a Viking in the night in California," Bates said. "We cover 64,000 square miles in central California and are driving to expand to rural communities."

3Com is focusing its management efforts on its TranscendWare policy-based management offering, which lets IS managers provide users with varying classes of network performance.

And it is expanding its virtual networking technology, which lets IS managers create logical LANs to address changing workgroups.

"[Advanced] network management will be our salvation," said J. L. Albert, computing and information services director at Oklahoma State University (OSU) in Stillwater, Okla. "Our user base moves all over the place and is very demanding. Virtual networking and the tools to manage it would help us [greatly]." □

Room for improvement

3Com would be well-advised not to take its eye off the customer as it assimilates U.S. Robotics, according to the results of a user survey disclosed at the internetworking powerhouse's user conference last week.

For the nearly 400 user respondents, service and support is the area where 3Com has the most room for improvement.

Users ranked 3Com's service and support five out of a possible seven in the survey. It got the lowest rating of any category.

"As companies get bigger, they tend to get impersonal, and this is the biggest merger in networking history. But [3Com CEO Eric Benhamou] has done a great job with all 3Com's other mergers over the years. I'm confident he can pull this one off," said Rob McKenna, vice president of global network engineering at Sumitomo Bank Capital Markets, a longtime 3Com customer.

"When companies get bigger, it's so easy to get insulated from changes in customer buying patterns," admitted Benhamou in his speech to the user group after the $8.5 billion merger with U.S. Robotics in Skokie, Ill., was approved. He said 3Com has expanded — and will continue to expand — its field services operations to improve support.

— Bob Wallace

Many earn big bucks for referring IS pros

CONTINUED FROM COVER 1

That's right. In today's tight skills market, friends, relatives, hairdressers and bartenders can collect big bucks for referring IS professionals to companies desperate to hire them.

Other new "show me the money" recruiting tactics include giving signing bonuses to college recruits and paying a commission to human resources employees for each IS professional they recruit.

All of this adds to recruiting costs, but it is still cheaper than paying a headhunter as much as 30% to 40% of a new employee's base salary.

Atlanta-based NationsBank Corp., for example, pays in-house recruiters as much as $1,000 for reeling in a senior-level IS professional. And there is no cap on how much a recruiter can earn in bonus money.

Last week, NationsBank recruiter Charlotte Pedersen told attendees at *Computerworld*'s Technical Recruiting Conference in San Antonio, Texas, that she has earned bonuses totaling as much as 25% of her base salary.

"It's the best recognition I've seen in a long time," she said.

"We're trying to motivate recruiters. If they want to burn the midnight oil and do deals, they can make a lot of money," said Bill York, senior vice president of management recruiting at the bank.

Employees also can earn big money for IS referrals.

At Cargill, Inc. in Minneapolis, employees receive a $10 gift certificate for each name they pass on to the company. If the prospect is hired, the employee receives $2,000, with no limit on the time it takes the company to hire the person.

Increasingly, just about all IS hiring — especially at the senior level — involves paying somebody a bonus, said Connie Pate, an Irving, Texas-based director of recruiting at Ernst & Young.

"One of the only ways senior IT people will even entertain an offer is through an agent. They don't answer ads. They want someone to negotiate for them," she said.

But recruiters said referral bonuses pay off in the long run. For most, referrals are the most effective recruiting tool, and recruiters pay between $250 and $6,000 per referral, according to a recent Ernst & Young survey of best practices among leading companies.

At Brannon & Tully, Krutak said he hires more than 40% of IS employees through referrals.

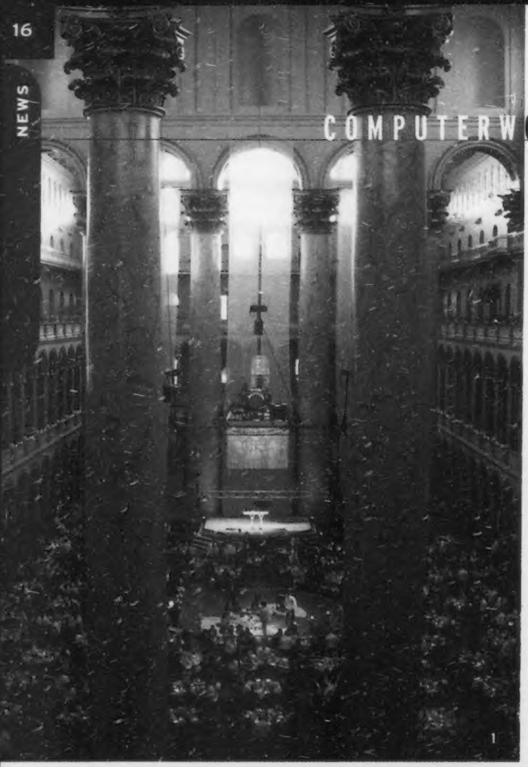
DIANE FENSTER

But be advised: Paying referral bonuses can backfire.

One recruiter at the conference told of an employee who took out his own display advertisement seeking IS professionals. After collecting more than 200 resumes, he presented them to the recruiter, who didn't say whether he paid out any bonus money.

A publishing company in the Southeast that recently tripled the bonus it pays for IS referrals was forced to offer the higher bonuses for referrals across all of its business departments.

"It became a tricky line because it looked like IS got preferential treatment," said a company recruiter. Overall, the recruiter added, "there seems to be a lot of jealousy because IS keeps doing things to address the shortage." □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COMPUTERWORLD SMITHSONIAN AWARDS

Technology brings honors

▸ Computerworld *Smithsonian Awards pay tribute to innovators*

By Stewart Deck
WASHINGTON

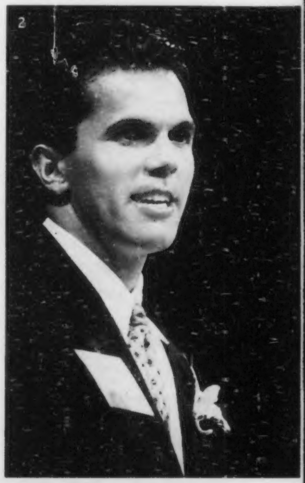
USUALLY THE four-story Corinthian marble pillars in the grand hall at the Smithsonian's National Building Museum tower over everything else. Last week they faded into the background as industry luminaries and innovators stepped forward to accept the Ninth Annual Computerworld Smithsonian Awards.

The awards, for technology applications that illustrate "a profound, positive and demonstrable impact on society," covered 10 categories from manufacturing to media and arts to science. Although multinational corporations and government organizations were well-represented as nominees, many of the winners demonstrated the power technology brings to individuals.

New York school teacher Susan Abdulezer, warmly recognized by the audience of 800 industry leaders as the first two-time award recipient, expressed astonishment at receiving her prize in education and academia. "The Information Age has allowed individuals to change very fundamental problems themselves," Abdulezer said. (See winners, next page.) □

COMPUTERWORLD

For expanded coverage of the *Computerworld* Smithsonian Awards, including photos and audio interviews with winners, visit *www.computerworld.com*.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PHOTOS BY STAN BAROUH

1 - Interior of the Smithsonian's National Building Museum **2** - Mark Strama, program director of Rock the Vote **3** - Leadership award winners Seymour Papert, Tim Berners-Lee, Frederick Hausheer, Hasso Plattner **4** - Stephanie Reel, vice president and chief information officer, The Johns Hopkins Medicine Center for Information Services **5** - UPS's John Consigli, Joan Schnorbus, Kathy Sgroi and Tom Ferro **6** - U.S. Environmental Protection Agency's Robert Dyer and David Alsop **7** - Rafael Alvarez, Eduardo Alvarez-Cordero from The Peregrine Fund, environmental award winners **8** - Hongkong International Terminals Ltd., award winners for transportation **9** - Two-time award winner Susan Abdulezer and Seymour Papert

8

9

COMPUTERWORLD SMITHSONIAN AWARDS

Information Technology Leadership Awards

Price Waterhouse Award for Lifetime Achievement
Andrew Grove, co-founder and CEO of Intel Corp.

MCI Award for Innovation
Tim Berners-Lee, developer of the World Wide Web

Silicon Graphics/Cray Research Award for Breakthrough Science
Dr. Frederick Hausheer, chairman and founder of BioNumerik Pharmaceuticals, Inc.

Ernst & Young Award for Global Integration
Hasso Plattner, co-founder of SAP AG

NEC Leadership Award for Education
Seymour Papert, author and educator

1997 *Computerworld* Smithsonian Award Winners

Business and Related Services:
(two winners)
The Johns Hopkins Health System and The Johns Hopkins Medicine Center for Information Services for an electronic patient record system.

United Parcel Service of America, Inc. for its worldwide package-tracking system.

Education and Academia:
Educator **Susan Abdulezer** for a CD-ROM presenting the alphabet in six learning modes for preschool children with a range of learning disabilities.

Environment, Energy and Agriculture:
The Peregrine Fund for The Harpy Eagle Conservation Program.

Finance, Insurance and Real Estate:
Flagstar Bank for a videoconferencing and automated system that lets loan applicants collaborate face-to-face with actual loan underwriters.

Government and Nonprofit Organizations:
Massachusetts Department of Revenue for two tax processing systems: the imaging of paper forms and a telefile system.

Manufacturing:
Buckman Laboratories, Inc. for an online knowledge-sharing network.

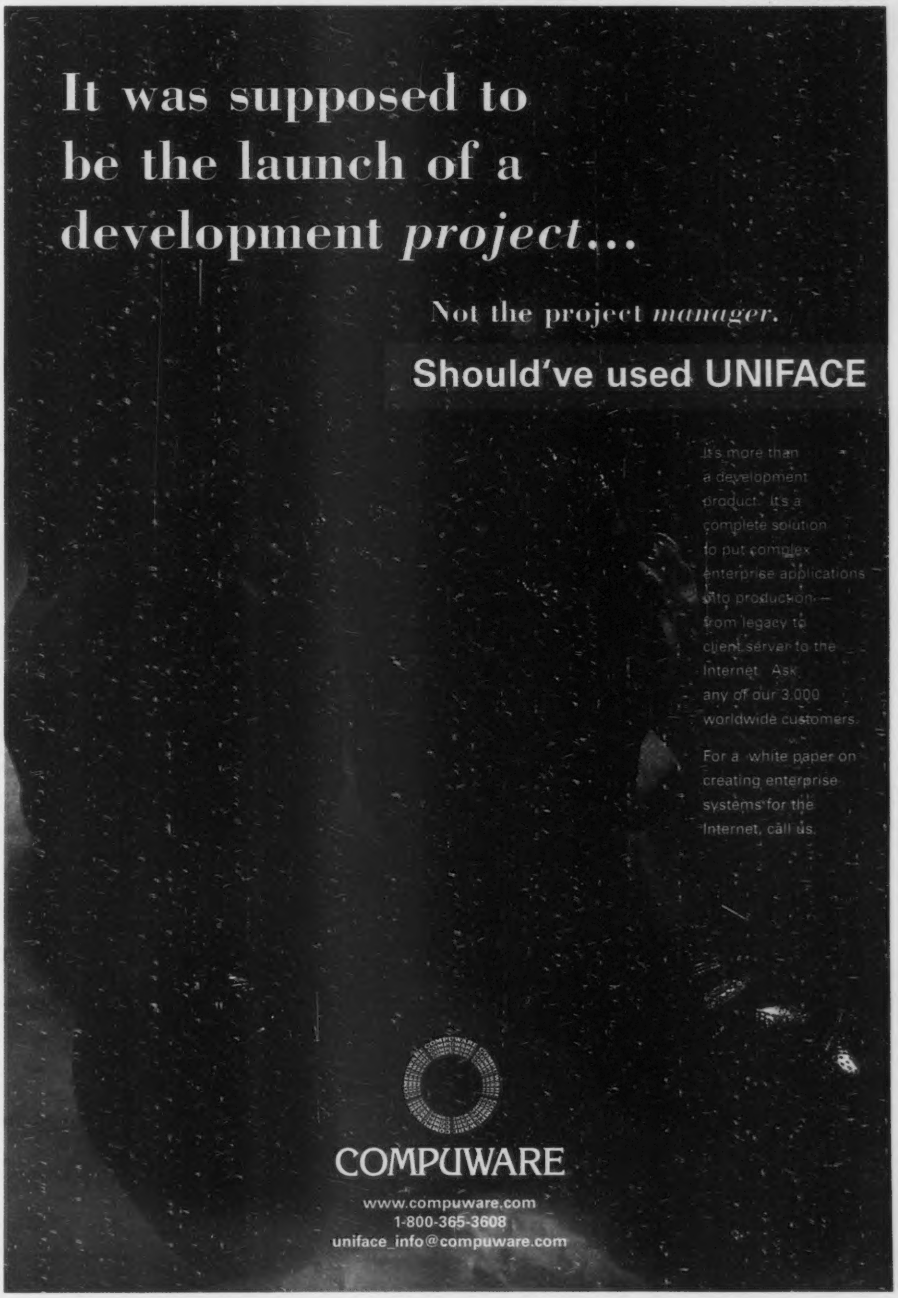
Media, Arts and Entertainment:
Rock the Vote for a voice-response system able to process up to 20,000 voter registration calls per day.

Medicine: (two winners)
InterMountain Health Care for a combination of data warehousing, project tracking and Internet technology used to link 24 hospitals and more than 70 clinics.

U.S. Environmental Protection Agency for human lung supercomputer simulations.

Science:
The Center for Analysis and the Prediction of Storms and Pittsburgh Supercomputing Center for four- to six-hour severe-storm forecasting system.

Transportation:
Hongkong International Terminals Ltd. for using technology to meet the needs of the shipping community into the 21st century.



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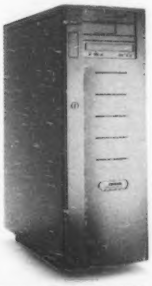

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▸ *IBM rolls out next generation of air-cooled CMOS systems*

By Tim Ouellette

MAINFRAME SHOPS may start to think they are managing nimble desktops, given the speed with which IBM is upgrading large-systems processors.

IBM last week rolled out its long-expected Generation 4 (G4) machines, a mere nine months after its G3 models hit the streets. Gone are the days of five-year product life spans in the data center.

IBM also doused users with a flood of related software and operating system upgrades in an effort to woo new sites to the S/390 platform.

The G4 series mainframes include air-cooled CMOS processors that reach 63 MIPS, equal to that of IBM's water-cooled mainframes. The current G3 line reaches a top rating of 45 MIPS for one processor.

CMOS systems offer huge savings in space and energy costs compared with the older lines, but until now haven't offered the same power as the older machines [CW, May 26].

For example, Automatic Data Processing, Inc. may see a 10% output increase by moving from G3 to G4 machines, said Renato Crocetti, corporate vice president for information technology at the Roseland, N.J., billing outsourcer.

BIG IRON BLOWOUT

IBM's S/390 announcements feature:

- G4 line of 63 MIPS processors
- OS/390 Version 2
- Integration of Tivoli TME system management
- Net.Connect, Net.Data and Java for OS/390 rollouts
- Expansion of the low-end Multiprise 2000 line

For high-end users, IBM also tweaked the performance of its multiprocessor mainframes, which in the past decreased in relative power as chips were added. Now, the 10-way RY5 model will include special cooling hardware that chills the CMOS processors and gets them to the same power as older 10-way water-cooled machines.

MATCHING THE H5

With the new internal cooling in the RY5, "IBM has at the highest end enabled equivalence to the old H5 processors," said John Young, an analyst at The Clipper Group, Inc. in Wellesley, Mass.

To add spice to that power package, IBM in October will ship a new version of OS/390, its mainframe operating system, with 20 new features.

Those include support for Tivoli System, Inc.'s TME 10 system management framework, a component broker tool kit for integrating object technology and a Lotus Development Corp. World Wide Web server.

Linda Sanford, general manager at IBM's S/390 division, said further S/390 development would continue to ratchet up processor performance and streamline IBM's parallel sysplex clustering scheme. And the company will try to make OS/390 more attractive to application developers via object tools and Java integration.

"We will remove all the complexity for application development on the S/390," Sanford said.

To ease migration from G3 models, users can move to the G4 platform as a G3 upgrade instead of buying completely new systems. ☐

Global Internet bank a no-go in Idaho

By Sharon Machlis

"BORDERLESS" INTERNET commerce ran into Idaho consumer protection laws recently when the state demanded that an Internet bank stop seeking deposits from Idaho residents.

The move is the latest salvo between companies that conduct electronic business and government agencies that seek to regulate them. Legal jurisdiction questions have arisen elsewhere on the Internet in cases relating to stock offerings, taxation (see story, page 1) and online gambling.

The Idaho Department of Finance late last month issued a cease-and-desist order against European Union Bank (www.eubank.ag), chartered in Antigua, charging that only state or federally chartered institutions can lawfully solicit bank deposits within Idaho's borders.

"European Union Bank is not authorized, supervised or regulated by any U.S. state or federal bank or financial institutions regulator," according to a statement from the Idaho Finance Department. Also, deposits aren't covered by federal insurance. No one from European Union Bank would comment on the charge.

"To my knowledge, it's the first state action of its kind, but not unexpected," said Kenneth Bass III, an attorney at Venable, Baetjer, Howard & Civiletti in Washington. "We have been waiting to see which jurisdictions would be moving to try to regulate [Internet commerce]."

> **"It's a clash between the global nature of the Internet ... vs. legal and regulatory [systems] which are provincial," says attorney Barry Weiss.**

Banks with a physical presence in the U.S. must comply with federal and state regulations. But the Federal Reserve Board, which oversees commercial banks, has no rules governing institutions on the Internet unless they also have a U.S. office, according to Joseph R. Coyne, assistant to the board.

"We're going to continue to see these types of cases come up," said Barry Weiss, a partner at Gordon & Glickson PC, a law firm in Chicago. "It's a clash between the global nature of the Internet ... vs. legal and regulatory [systems] which are provincial."

Weiss said many companies setting up businesses on the Internet are trying to decide whether they should try to comply with myriad regional laws and regulations or simply launch their businesses and respond to local complaints as they arise. With case law relatively scarce on the subject, companies are making their decisions based largely on budget issues and their taste for risk, Weiss said.

Some observers said the nature and popularity of the Internet eventually will wear down the need for electronic business to conform to numerous local regulations. But others fear that a balkanized system of rules will govern anyone who seeks to conduct transactions on the Web.

"I think in many areas you'll see federalization and globalization of rules," Weiss predicted. "But it's going to take a lot of time." ☐

IF WE COME ON A BIT STRONG, IT'S BECAUSE WE NEVER FORGET WHO WE'RE TALKING TO.

Marc Andreessen
Uber-Webmaster
Netscape Communications

Tax laws apply to 'net

CONTINUED FROM COVER 1

of an access modem or server in a state will require them to collect sales taxes from customers in that state.

State auditors also want to expand their multistate data-sharing agreements so they can catch online transactions in which sales taxes should have been collected but weren't.

"Even in cyberspace, there is no ducking the inevitable: The tax collector is coming," said Gene Gavin, Connecticut's tax commissioner.

"I'm a believer in paying taxes ... but what I've seen so far is a rush to tax."

– Robert Olson, Virtual Vineyards

If online sales taxes spread across 50 states — with 30,000 separate taxing jurisdictions — the administrative burdens would fall heavily on companies that don't have the software or staff for multistate tax compliance, experts said.

Business groups, such as the Interactive Services Association in Silver Spring, Md., said they want uniform electronic tax rules for all states.

"Congress could ask [the states] to tax it in an uniform and consistent way," said Walter Hellerstein, a law professor at the University of Georgia School of Law in Athens. "Having said that, you have to appreciate the fact that for two centuries we have lived with a federal system where inconsistency, at least to some extent, is the price that we pay for our system."

"I'm a believer in paying taxes ... but what I've seen so far is a rush to tax," said Robert Olson, president and founder of Palo Alto, Calif.-based Virtual Vineyards, Inc., which sells wine and specialty foods on the Internet.

In general, Internet shopping sites have to follow the same rules that traditional mail-order companies follow, said Robert Frey, who heads the Internet business for Lands' End, Inc. in Dodgeville, Wis.

Under a ruling by the U.S. Supreme Court, merchants must collect sales taxes if there is a "nexus" — a physical connection — between the merchant and the state. For example, if a merchant has a store, factory or office in New York, customers there must pay the state's sales tax.

But what is a physical connection for an Internet-based business?

In Connecticut, a "point of presence" such as an access modem in the state is enough to create a nexus, officials there have ruled.

That means America Online, Inc. in Dulles, Va., and CompuServe, Inc. in Columbus, Ohio, are supposed to collect Connecticut's 6% sales tax from customers. The state expects to earn $5 million in revenue this year from that ruling, which America Online is fighting in court, state officials said.

SERVER LOCATION COUNTS

In Texas, tax officials recently decided that a World Wide Web page based on a server located in that state creates a nexus. "If software is downloaded from a server here in Texas, then it's the same as coming to Texas to pick up the software — even though you may be out of state," said Lindey Osborne, a state tax policy official.

Some businesses may steer clear of states that aggressively tax online transactions. "The conclusion I reached is we will try to stay out of Texas, from the standpoint of creating a server there," said Bill McKiernan, president and CEO of Cybersource, Inc. in San Jose, Calif., which sells software via the 'net.

California, mindful that businesses move to favorable tax climates, has taken a 180-degree turn away from the Texas approach.

California's Board of Equalization recently decided that having a Web page in the state doesn't create a nexus, making the state something of an Internet tax-free zone that hopes to attract economic development.

Experts said states eventually will try to tax Internet shoppers wherever the Internet service provider or online service has a presence. For example, a flower shop doing business on the AOL network would have to collect taxes wherever AOL has a modem or server.

TAX HEADACHES

Online businesses are faced with these problems when a state decides to levy taxes on electronic commerce:

- **The initial decisions to tax electronic commerce aren't the result of new state laws, but of reinterpretations of existing laws. These decisions may be made behind closed doors.**
- **An online business may learn about the new tax the same day an auditor arrives.**
- **An auditor can assess past-due taxes back several years.**
- **A company can spend thousands of dollars fighting a state's action in court.**

Bruce Reid, state and local tax director at Microsoft Corp. in Redmond, Wash., framed the issue this way: "Does AOL's point of presence [in a state] give it nexus? And if it does, does it then drag in everybody who is on their service?"

Industry groups said Reid's question could take years of court battles to answer and could create lots of uncertainty in the meantime.

"The conclusion I reached is we will try to stay out of Texas."

– Bill McKiernan, Cybersource

"It's not good enough for the courts to pick up the pieces. The damage will have already been done, and the chilling effect could last for years," said Robert Levering, a senior vice president at the Direct Marketing Association in New York.

A KPMG Peat Marwick survey last year revealed that 67% of financial executives found state sales tax laws "ambiguous" in the online world. Half the 291 respondents said that would inhibit online commerce.

But this year, companies are rushing into electronic commerce despite the murky tax situation, analysts said.

Fear of the unknown hasn't kept John Williams, president and CEO of Biztravel.com, Inc. in New York, from setting up a travel service on the Internet, for example. Taxes are just one of the many "great uncertainties" of the online business frontier, he said.

Indeed, most forecasters predict electronic commerce will grow from $500 million this year to anywhere from $70 billion to $600 billion by 2000.

CASUALTIES

But state tax audits can produce some headaches for online businesses.

One firm being taxed in multiple states complained that many states require paper copies of electronic purchase orders.

"We can provide [a printout], but because it's not on the [company] letterhead, dated a certain date, it's not a legal copy," complained an information systems manager in Texas who didn't want to be identified.

He called the paper requirement "a leftover from the 1950s" and said it is an expensive one to meet.

Although analysts said taxes haven't been a significant barrier to electronic commerce so far, the tax battle has had casualties among Internet service providers on the front lines.

James Walton. owner of an Internet service provider in Nashville, said the tax problems created by Tennessee's ruling were too much for him to bear.

He closed his business late last year and doesn't plan to open a new one. "It's hard to write a business plan when you don't know what you're facing," he said. □

The scramble to replace tax sources

The issue of Internet taxes seems to be in limbo as the players wait for congressional action on a 'net tax moratorium.

The Internet Tax Freedom Act, sponsored by Sen. Ron Wyden (D-Ore.) and Rep. Christopher Cox (R-Calif.), would block new taxes on Internet commerce and may end up repealing taxes already placed on Internet service providers.

In essence, the legislation would pre-empt state taxing authority. States are scurrying to find voluntary, cooperative solutions to the online tax issue in the hope of avoiding pre-emption.

The Multistate Tax Commission, which represents 41 states and the District of Columbia on tax issues, is exploring whether online sales tax collections can be shifted to credit-card companies or "electronic cash" companies. Another idea is to see if tax compliance could be embedded in electronic-commerce software.

"This is a major initiative on our part to try to reach out to the industry and resolve this issue," said Dan Bucks, executive director of the Washington-based commission.

"We're already losing a good chunk [of tax revenue] through mail-order sales. As commerce moves to the Internet from downtown malls, we're going to lose more," said W. Val Overson, chairman of the Utah State Tax Commission in Salt Lake City. The states aren't trying to tap the Internet for new money, he said, but instead "are trying to maintain their [tax] base."

The fear that states have of tax dollars vanishing into cyberspace may be bigger than the actual threat, however. "Over the next five or 10 years, the amount of potential tax that could be collected through electronic commerce is going to be in the realm of probably under 5% of all state sales taxes," said Victor Wheatman, an analyst at Gartner Group, Inc. in Stamford, Conn.

— Patrick Thibodeau

"Everyone tells me

they know their way around

networks.

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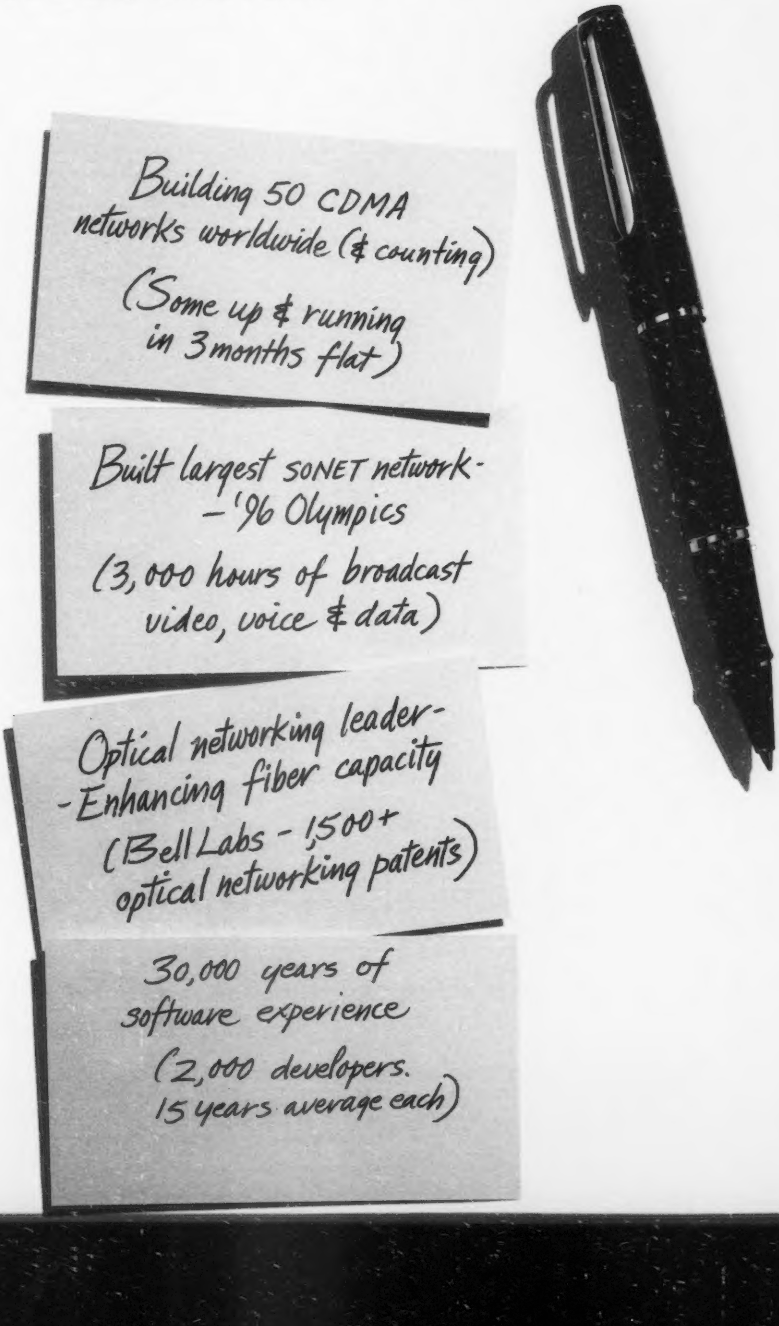

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Computer Industry

DG tries for enterprise comeback

▸ *Announces NUMA server in effort to get shops to notice them*

By Jaikumar Vijayan

AFTER FASHIONING a quiet little comeback for itself in the past few quarters, Data General Corp. wants enterprise shops to pay some serious attention to its hardware again.

The Westboro, Mass.-based company last week launched an Intel-based Non-Uniform Memory Access (NUMA) server that offers users relatively high-end Unix capabilities at aggressive new prices.

Once numbered among the midrange leaders, it will take more than just nifty technology and great prices for DG to make an impression in a market dominated by the likes of Hewlett-Packard Co., Sun Microsystems, Inc. and IBM, analysts said.

"DG wants to be a Unix competitor using hardware that has been driven up from the commodity market," said Rich Partridge, an analyst at D. H. Brown & Associates in Port Chester, N.Y.

"That's attractive to a section of the Unix market looking for decent performance at low cost. But it is certainly not going to be destroying any of the markets" dominated by mainstream Unix vendors anytime soon, he said.

DG AVIION 20000

- **NUMA support**
- **Up to 32 200-MHz Pentium Pros**
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- **Up to 100T bytes of fiber channel storage**
- **Starting price: $70,000 for a quad-processor system**

The server announcement marks a sort of coming-out party for DG, which has spent the past two years focused on steadying a once badly listing business — the company has been in the red for four of the past five years. Since 1995, it also has had to contend with a wrenching shift from Motorola, Inc. chips to Intel architecture.

"The thing with DG is that they made very sure they were not getting ahead of themselves at any point," said Roger Rodriguez, a systems administrator at Cigna Dental Health in Plantation, Fla. "What's good about them is that they have managed to stay on the cutting edge, without being too much on the bleeding edge."

DG's latest machines use NUMA technology to let users tie up to 32 of Intel's fastest Pentium Pro processors in a configuration capable of supporting up to 32G bytes of memory and up to 100T bytes of storage.

NUMA technology lets vendors cost-effectively tie numerous processors together in configurations that extend well beyond other architectures such as symmetrical multiprocessing (SMP). That kind of scalability is required for things such as online transaction processing and database applications.

Because DG mainly uses commodity components and motherboards from Intel to achieve that scalability, it hopes to deliver these systems at significantly lower prices. A 32-processor DG Aviion 20000 with 4G bytes of memory will cost about $690,000. Enterprise-class SMP servers from vendors such as Sun start at more than $1 million but typically offer greater performance. □

Start-up Novonyx dives in to Internet arena

By Laura DiDio

NOVONYX, INC., the privately held start-up jointly funded by Novell, Inc. and Netscape Communications Corp., has ambitious plans to ship its first intranet/Internet products by fall.

Novonyx's strategy is simple and straightforward: Get to market quickly with products that combine Netscape's World Wide Web servers running as services on top of Novell's IntranetWare and use Novell Directory Services (NDS) and the Lightweight Directory Access Protocol.

Marketing the new products would be a boon for Novell's installed base of 60 million NetWare nodes worldwide — about a third of which currently use NDS — because it would preserve their investment in existing NetWare/IntranetWare software.

Thus far, no other businesses offer a similar competing offering that combines and integrates full-blown directory services with Web servers. Nonetheless, Novell is still perceived as trailing Microsoft and Sun Microsystems, Inc. in the Internet arena.

Novonyx will ship its two initial products this fall: Netscape Enterprise Server 3.0, a high-end Web server, and Netscape FastTrack Server bundled into IntranetWare 4.11.

BEING CAREFUL

Users reacted with cautious optimism.

Matt Rice, vice president and senior network manager of information systems services at USTrust Bank Corp. in Cambridge, Mass., said Netscape Web servers integrated with IntranetWare and NDS could preserve his investment in existing networks and reduce management tasks and training time.

"Right now, I have to administer my Web servers and my NetWare file servers as two separate entities. The Novonyx software will save me a minimum of 10 hours of management time each week," Rice said.

Other users, such as Len Steinbach, director of information technology at the Solomon Guggenheim Museum in New York, expressed reservations about Novonyx's chances for success given the spotty track record of other recent start-ups that also had the backing of top-tier vendors. □

• No longer a quiet outsider

Baan strives for focus

By Randy Weston
PUTTEN, NETHERLANDS

The Baan Co. founder and CEO Jan Baan last week sat down with Computerworld *at his company's headquarters in a small farming village located about an hour outside of Amsterdam. The remote locale is fitting given that Baan has been a quiet outsider in the client/server application race. But it has made great strides in recent years, landing larger and larger customers, such as The Boeing Co. and Ford Motor Co., and catching the attention of Wall Street. What follows are Baan's thoughts on some critical issues facing the packaged application industry.*

The role of enterprise resource planning (ERP) systems in corporate information technology:

The word enterprise resource planning is not right. Why not ERB, enterprise resource backbone, which is what it is becoming today. It is more than a planning system. It is a backbone for enterprises. Every manufacturer is using components for the supply chain. But we [as an enterprise software supplier] have to sell all of it.

The move to object orientation:

Today, it is easy for me to build in C++ an object-oriented solution. I could have done it three years ago, but it was not scalable. In the next five years, we will go with relational database technology because object-oriented technology is not scalable. On the other end, I would like to have today the Web stuff also in [Common Object Request Broker Architecture]. But this is a paradox. How can you handle these two technologies together? This is what we have to learn. Baan is moving that way, step by step.

SAP AG's saturation of the top market:

We have to respect that a lot of SAP installations are already there. Why should we not respect that and link our two systems and admit we don't do everything? There was a study from one of the Big Six firms that showed in the top 100 companies, maybe 50% had SAP installations. But if you look at those plans, the installations were less than 10% done, which means there is a big market still.

"My major competitor is not a company in Germany – it's complexity. We have to kill complexity. It's a paradox in this business."
–Jan Baan,
CEO and founder

The problem with the state of client/server computing:

My major competitor is not a company in Germany — it's complexity. We have to kill complexity. It's a paradox in the business. Even if it seems the ERP players are great. They are able to make business flexible, and client/server makes technology more flexible. But what do you achieve? More complexity. We increase source code, we increase everything.

The industry push toward vertical markets:

We don't want to be a copy of SAP and go everywhere. We like to win in lines of business. Focusing is most effective for us. Why should we go to banking, to government, to insurance, to everyone? We can go to the whole supply chain in our markets. □

How long will it take before you with their credit

{ Imagine if it

The impact on your business would be enormous. The ROI nearly immediate. But the revenues generated from secure credit card transactions are just the beginning. Suddenly you're able to share confidential information over the Internet with your customers, employees and business partners. Your business becomes more efficient and competitive.

So what does it take to begin? A partner who truly understands the impact networking can have on your business, and knows how to implement it down to the last strand of wire and the last packet of data. We're that partner. Our technologies

OPINION

Slim-fast IT There's a reason we're attracted to network computers, and it's not just cost of ownership.

We're swamped by information overload, hardware churn and software featuritis, so we hunger for anything that offers that rare attribute called simplicity. It's defined as "freedom from complexity." We yearn for information systems that are low-maintenance, compatible, streamlined and filtered.

Evidence of this quest for simplicity is everywhere, from the popularity of *Dummies* books and flat-rate pricing to this week's Leadership Series article on the dangers of too much technology. People are tired of multiple messaging systems and rapid-fire software upgrades. Some are sticking with older machines and older software because they work just fine.

Consider the World Wide Web browser. It's the interface du jour because it has four basic actions: click on blue things, go back, go forward and keep bookmarks so you can get there again. No training required. The bulky new "features" in the 4.0 releases only increase the risk of incompatibilities, system crashes and higher training costs.

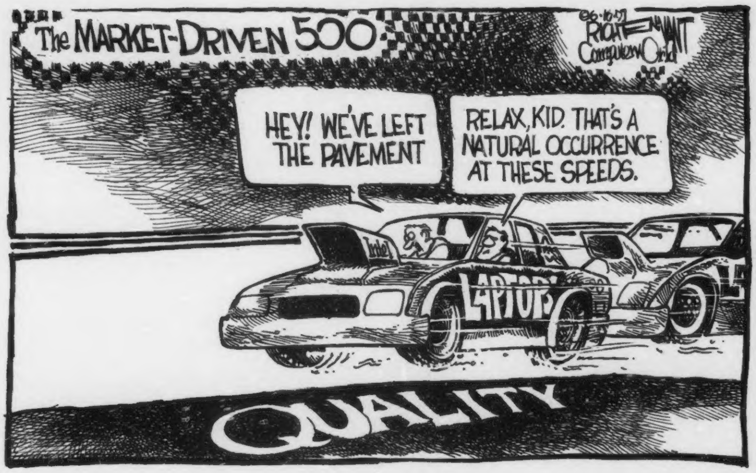
This isn't just technostalgia or a diatribe against what Nicholas Negroponte calls "digital obesity." The upbeat message is that the search for simplicity is a golden opportunity for IS managers.

Walk into your business units and ask how you can simplify users' work. The answer may be as mundane as writing a macro that cuts five steps from an everyday task. It may mean consolidating message systems or deploying applets instead of bloatware.

This isn't dumbing down. By making simplicity the IS standard, you give users "freedom from complexity" so they can focus on truly productive work. And you'll be a hero to grateful users.

Mitch Betts.

Mitch Betts, Assistant news editor
Internet: *mitch_betts@cw.com*



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HEY! WE'VE LEFT THE PAVEMENT
RELAX, KID. THAT'S A NATURAL OCCURRENCE AT THESE SPEEDS.
Intel
LAPTOPS
QUALITY

LETTERS

Re-engineering would be aided by motivated workers

IN "IS RE-ENGINEERING still relevant?" [CW, April 21], David Coleman emphasizes the failure of re-engineering as the result of not taking people into consideration.

But how should people be taken into consideration in business process re-engineering? By now it should be obvious that where work is the manipulation of information, high motivation of the workers is essential.

Surely part of the answer is to re-engineer jobs so there are opportunities to make decisions that count, involve more difficult tasks — not more work — and provide more responsibility.

Tom Shillock
Shillock Consulting
Portland, Ore.

Get better pay and buy your own pinball machine

KILLER PAY? Life my way? Yay! As a member of Generation X, I take exception to your May 5 Page 1 article, "All work, no play? Gen X-ers: No way." Instead of imploring corporate America to follow the example of a few who give their young professionals pinball machines in the name of fun at the expense of offering them competitive salaries, the article should have explained that what they're really doing is substituting bogus benefits for real ones to cut costs on their No. 1 expenditure: employee services.

The story misses the point completely with the highlight on Pete Fazio, an example of this Gen-X trend toward accepting low wages and long hours near a pinball machine.

By taking a job that requires all his time in exchange for little more than continued opportunity to hang around with the same people he sees all day, every day, Fazio deprives himself of the time and compensation he deserves to enjoy life beyond work.

As a consultant and a young professional, I work hard to make sure that my client gets quality service. At the end of the day, however, I return to being a young person whose life extends beyond the office.

My life extends beyond the office.

I make sure my compensation is competitive because I enjoy the choices it affords me in that life. Fazio, and the others of my generation who follow him, take heed: Corporate culture is a myth that expires as soon as you go home.

If you leave your current position for one that is well-compensated, you can buy your own pinball machine.

Jason Couchman
Durham, N.C.

Intel competes unfairly with proprietary Pentium II

IN YOUR article "Pentium II delivers speed to desktop," [CW, May 5], you quote Linley Gwennap, an analyst at Microdesign Resources, saying the new modular design of the Pentium II "shouldn't hurt end users ... because it will let vendors bring products to market faster."

This may be true, but I would also add that this modular design — the slot 1/single-edge cartridge — is owned by Intel and is not an industry standard, unlike the socket 7 of the current Pentium motherboards. This does not promote equal competition from other vendors such as AMD and Cyrix and therefore does not force Intel to play on a fair and competitive field.

Chris Duhl
Dearborn Heights, Mich.
cduhl@dhol.com

Requiring permission to link Web sites would be onerous

REGARDING YOUR story on the Ticketmaster vs. Microsoft case ["Suits attack Web fundamentals," CW, May 5]: A lot of people seem to be missing the point of links. The Web was designed to be a conduit for the easy dissemination of scientific information.

Scholarly literature has always used references to point readers to additional information on the subject. No one asks for permission to use a particular reference.

The same rationale should hold for the Web. Must *Computerworld* seek permission from the site owner every time it cites a Web address in a story? It's the same concept. Requiring permission to provide links would be onerous.

Edward F. Martz
North Kingstown, R.I.

Computerworld welcomes comments from its readers. Letters shouldn't exceed 200 words and should be addressed to Maryfran Johnson, Executive Editor, Computerworld, PO Box 9171, 500 Old Connecticut Path, Framingham, Mass. 01701. Fax number: (508) 875-8931; Internet: letters@cw.com. Please include an address and phone number for verification.

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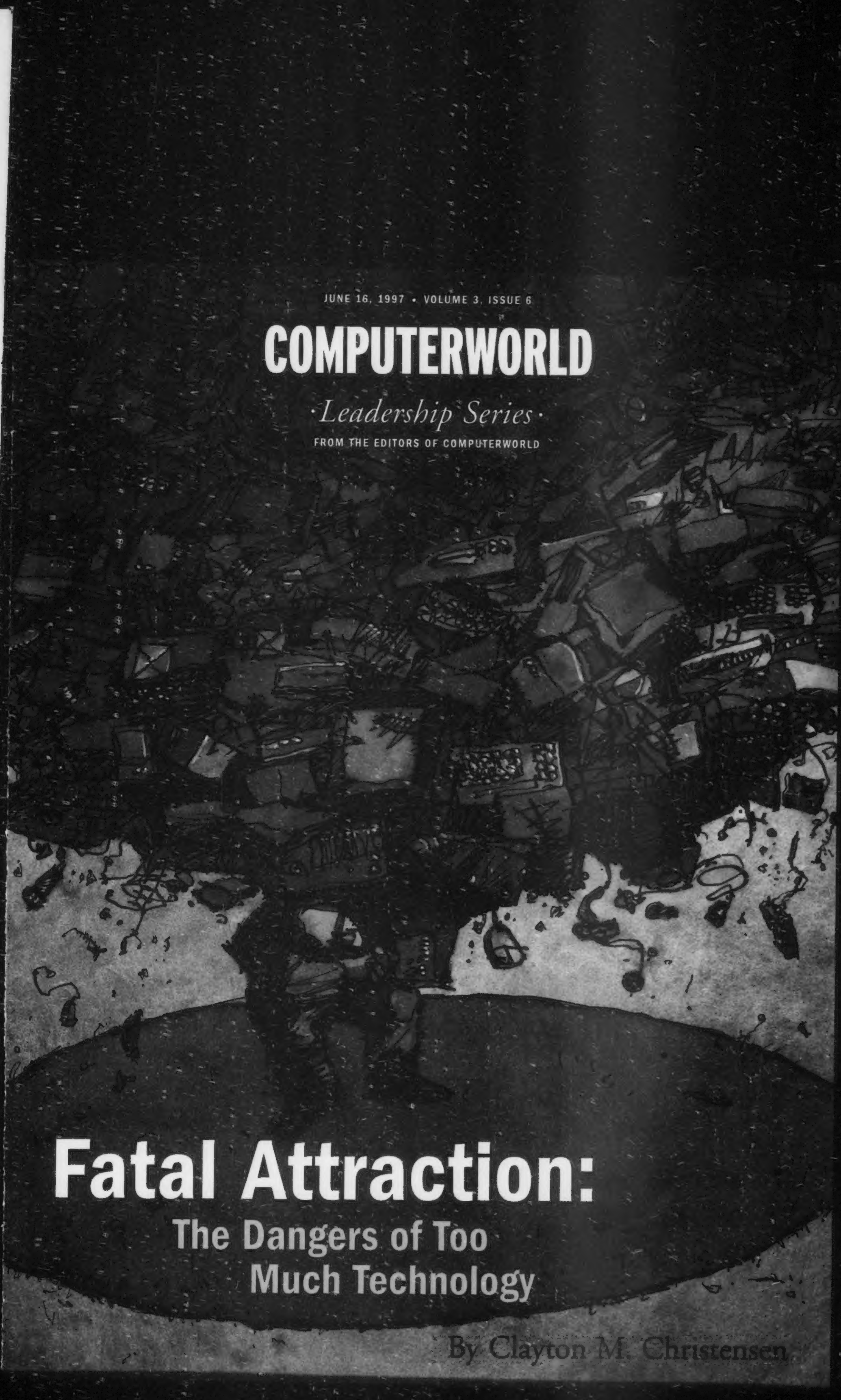
COMPUTERWORLD

·Leadership Series·

FROM THE EDITORS OF COMPUTERWORLD



Fatal Attraction:

The Dangers of Too Much Technology

By Clayton M. Christensen

Is the road to hell paved by power users?

History has shown that great high-tech companies ruin themselves by offering too much technology in order to please high-end customers.

Great IT organizations can make the same mistake, warns Clayton Christensen, author of the new book *The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail.*

Here's why best practices such as listening to your customers can lead to

disaster.

Have you ever wondered why great companies hit the skids? Why companies you once admired for astute, aggressive management, anticipating customer needs and consistently having the right product at the right time have subsequently stumbled badly?

For example, Sears, Roebuck & Co. was once admired as one of the best-managed companies in the world; in the mid-1960s most observers and scholars of management held the executives of Sears in the same high regard that most people today reserve for management of companies like Wal-Mart. Yet Sears today is regarded as a company that missed most of the important waves of innovation in its industry: Discount retailing and home centers were new retailing formats that stripped Sears of its core franchises. Sears had enormous leads in the credit card business and in catalog retailing, but it let those waves pass it by, too. What is most disturbing is that Sears missed these crucial waves of innovation during the very years when everyone regarded the company as one of the best-managed firms in the world! Digital Equipment Corp., Xerox, IBM and Computervision are similar examples: They once sailed atop their industries but then fell on hard times.

Of course, companies stumble for many reasons, including arrogance, bureaucracy, short investment horizons and just plain bad luck. An important factor behind the fall of many good companies, however, is that they did everything right! They listened closely to their customers; invested aggressively in the technologies that promised the highest returns; and weeded out unprofitable ideas targeted at minor markets. It is these practices — which are at the core of what we know as good management — that can lead great companies toward trouble. These same practices can also hurt IS organizations, by pushing them to invest in too much bleeding-edge technology.

The disk drive dilemma

Consider what happened over and over again in the disk drive industry, where the size of the disks has shrunk from 14 to 8, 5.25, 3.5, 2.5 and now 1.8 inches in diameter. A different company entered the industry and rose to become its leader in each of these product generations: No firm successfully stayed atop the industry for longer than a single generation.

In each case, the smaller, next-generation drive was designed in the firms that led the industry, by engineers who felt that "there had to be a market out there somewhere for a cheaper, smaller, simpler disk drive." Because the new drives packed less capacity than their larger predecessors, however, they couldn't be sold to the OEM computer makers that paid the disk drive companies' bills. These customers wanted faster, higher-capacity disk drives, not smaller, lower-performance ones.

As a consequence, the marketing and financial powers in the disk drive companies persuaded management to cancel the small-drive efforts.

Listening to the customer turned out to be the beginning of the end for those firms.

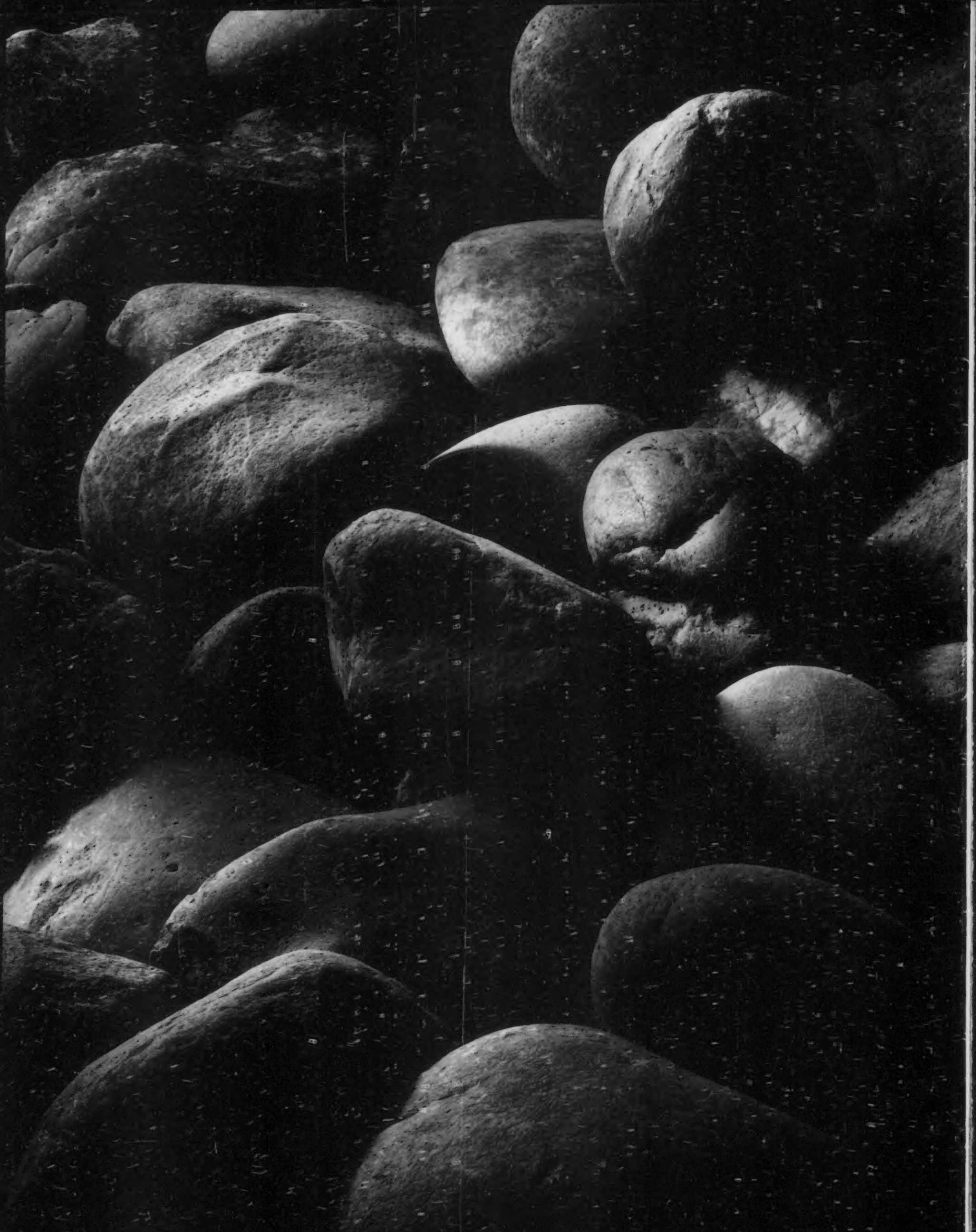
In each of these generations, many of the engineers who had designed the little drives subsequently left their employers and founded companies to make and sell smaller, cheaper drives.

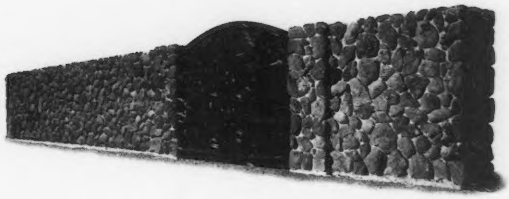
These start-up companies initially positioned themselves at the low-end of the market. None of the leading makers of larger drives followed the start-ups down-market because their customers couldn't use the drives and because the markets for them were so small that they appeared to be unprofitable.

The start-ups saw the world differently, however. They structured themselves to make money at the low volumes and low margins per unit that characterized their emerging markets.

Once established, they stretched the performance of their smaller drives with each new model, until they could satisfy the capacity required in higher-end markets. In the process, they drove the prior leaders from those markets.

ILLUSTRATIONS BY COURTNEY GRANNER





Mainframes, minis and micros

The words in this story could be changed to describe the same phenomena in the computer industry itself. It was initially dominated by mainframe manufacturers such as IBM, Control Data Corp., Remington Rand and Burroughs Corp. None of these companies led in developing the minicomputer. The minicomputer industry was built by a group of entrant firms — Digital, Data General Corp., Prime Computer, Inc., Nixdorf AG, Hewlett-Packard Co. and Wang Laboratories, Inc. — which subsequently moved aggressively up-market and began stealing customers from the low end, and then from the mainstream, of the mainframe makers' markets.

None of the minicomputer makers, however, led in establishing the PC market. Again, it was not because PCs were technologically difficult. It was because their performance was so limited that minicomputer makers could not sell PCs to their customers. It was far more profitable to develop next-generation minicomputers that could be sold at more attractive margins up-market. Hence, a different set of companies — Apple Computer, Inc., Tandy Corp. and a standalone unit of IBM — built the PC industry. And for the same reasons, it was Zenith Data Systems, Toshiba Corp., Compaq Computer Corp. and Sharp Corp. that pioneered the portable computer market, rather than the desktop computer makers.

The same mechanism lies behind the decline of some prominent software companies as well. Computervision, for example, helped pioneer the computer-aided design (CAD) market. As it strove to introduce ever higher-performance products, an entrant, AutoDesk, Inc., slipped in at the very bottom of the market. Its product, AutoCad, was cheap and could run on the IBM PC, but it was so limited in its functionality that no serious professional could use it. Computervision chose to focus its innovative resources on serving its customers better, improving speed and graphics, and on stealing share from its direct competitors.

At the bottom of the market, AutoDesk discovered an entirely different group of less sophisticated customers, who previously had not been able to justify purchasing a higher-cost, high-performance CAD system. As it cultivated these new applications, the company improved the capabilities of AutoCad with each release, moving relentlessly up-market. Within a few years, many designers who previously had needed expensive Computervision systems found that, while AutoCad was still not nearly as good as the Computervision system, it was good enough to do the job and was simpler and less expensive.

Computervision's response to this attack from below was to continue moving up-market (as did the leading computer and disk drive companies), ceding much of its original customer base to a cheap, simple product that had not warranted its attention just a few years before.

Lessons for technology users

What lessons do the experiences of high-tech companies have for their customers?

- **Too much technology can turn off customers.**

Providing too much technology — systems that offer functions users don't really want but lack qualities they find important — can frustrate executives and open the door to opportunistic outsourcers.

New software that pushes the

Customer Intuit-ion

By watching average customers, Intuit has stayed on top

Strategic-minded technology managers can best sense future customer needs not by listening to what leading customers say they need, but by watching how low-end and mainstream customers actually use their product. Intuit, the leading maker of personal and small-business financial management software, looks at its customers' needs in this way.

Intuit does this by sending its market researchers to computer retail stores. These researchers watch customers purchase their software and then ask the customers as they leave the store if they might literally follow them home to observe them installing and using the software for the first time. The researchers return on subsequent occasions to watch them use the product.

This helps Intuit's staff see first-hand the context in which their software is purchased and used, the functions and features of the product that are actually used, and the problems that are encountered. This has led them to come up with new ideas for how they can make their flagship personal finance product, Quicken, simpler and more convenient to use. This practice also led to the idea for Quickbooks, which is now the leading small-business accounting software package.

By watching Quicken customers in action, Intuit has chosen to focus primarily on improved convenience in use, rather than improved functionality. Intuit's new products typically parallel the changing needs of its mainstream customers, rather than overshoot them. Its customers as a result are highly loyal; are not over-served and overcharged; and are not ripe for the picking by low-end competitors which so frequently have upset the leaders in technology-intensive industries.

functionality envelope is usually risky business. It is frequently buggy, expensive and incompatible with existing systems. An IS organization's reputation can be harmed when new technology malfunctions or fails to deliver value. This risk will only increase as electronic commerce takes off, and IS becomes more involved in supporting corporate customers as well as internal customers.

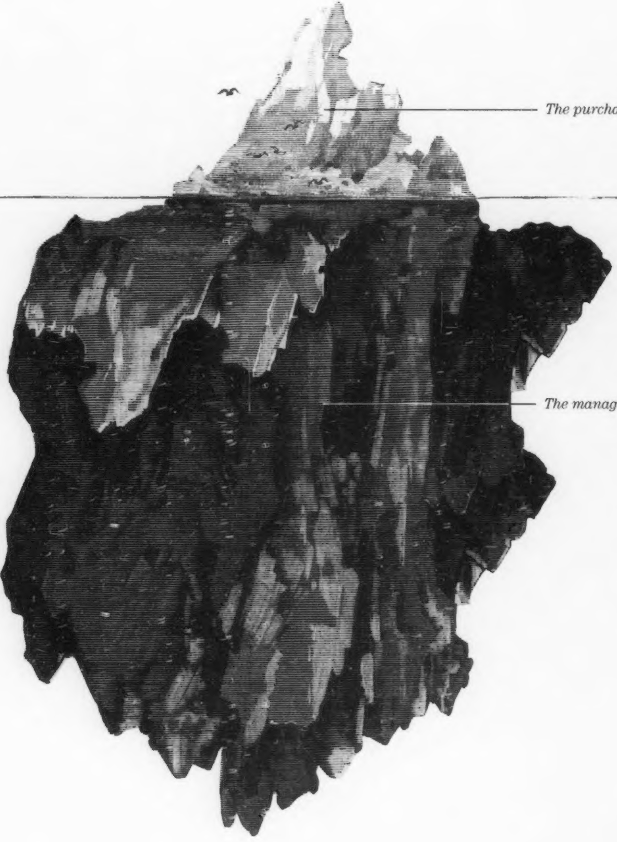
Software failures often cause corporate executives to give up on their in-house IT departments and turn to outsourcers for information services. When executives lose faith in their own IS organizations, they are much more likely to turn to an outside company which promises a simpler, more convenient and less expensive solution.

- **Listen to your average user and be wary of your power users.**

The most sophisticated or vocal IT users in the company can cause IS organizations to invest too much of their resources in adding new functions to systems, while the average employee's need for greater reliability and subsequently greater convenience remain unaddressed. In fact, investments in cutting-edge technology often reduce the very reliability and convenience that the "silent majority" of users sorely need.

Technology-driven IS departments are particularly likely to make this mistake. Pushed by overshooting suppliers and encouraged by some vocal, activist, functionality-hungry users, they pass up opportunities to provide more of the reliability and convenience that mainstream users crave.

IS organizations should watch how mainstream users use systems and products, to see what they need and value (see "Customer Intuit-ion" above). The needs of power users should be considered, but they should not come at the expense of the average user.



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■ Don't let vendors drag you up-market.

Buyers and managers of IT need to look carefully at the performance improvement which their IT users can absorb, versus how much performance improvement their suppliers are offering now and are planning to offer in the future. Suppliers whose products and services squarely address an organization's IT needs today often attempt to carry their customers up-market with them, convincing them to buy far more "technology" than they need.

Users of the massive, enormously complex enterprise resource planning (ERP) systems currently in vogue, such as those offered by SAP AG or The Baan Co., should watch their vendors carefully. They need to make sure these vendors don't follow the same path as the disk drive and minicomputer manufacturers.

ERP systems remind me of the time three decades ago, when Toyota and General Motors were each faced with the extraordinarily complex problem of scheduling production in their factories. General Motors (and thousands of American manufacturers like it) invested hundreds of millions of dollars in materials requirements planning systems. They purchased extraordinarily complex solutions to very complex problems. They

What Do Users Want?

1. **Functionality**
2. **Reliability**
3. **Convenience**
4. **Cost**

What happens when competing products both offer more functionality than the market demands? How do customers decide which competing product to buy?

In my research, it appears that when the market's need for improved functionality has been satisfied, customers will choose the product and vendor that is most reliable. When this happens, those companies that follow a strategy of offering superior reliability earn substantial price premiums in the market, compared to competitors who continue to push meaninglessly up-market along their functionality trajectory.

The same dynamic of overshooting market needs can occur in the reliability dimension, however. When the alternative products are all reliable enough, the basis of competition amongst products typically shifts again to convenience: Customers will choose those products that are most convenient to use, from those vendors that are most convenient to deal with. Again, competitors begin to improve their products, this time by offering ever-better levels of convenience. This pattern is pervasive, regardless of industry. By some counts, over 80% of the growth in the computer hardware industry, and nearly all of the growth in the foods industry, has come from companies and products whose fundamental value propositions have been reliability and convenience, not functionality.

It often happens that the trajectory of improvement in convenience eventually overshoots the market's needs as well. Typically at this point, customers will choose the product whose cost is lowest.

This pattern of competition has been observed and measured in industries as diverse as computers and disk drives, diabetes care products, hydraulic excavators and executive education. In each case, the shift from functionality to reliability, to convenience and finally to cost, has been triggered when multiple competitors have overshot the market need along the reigning dimension of competition. Very frequently, it is newcomers to the industry who see the opportunity to compete on a different dimension, while the established players overshoot the market, targeting the performance needs of a shrinking minority of the most demanding, vocal customers at ever-higher tiers in the market.

found, however, that these high-performance solutions were not convenient to use, and hence spit out unreliable schedules based on erroneous data.

Toyota, on the other hand, decided that rather than purchase a complex solution to a complex problem, it would simplify the problem. Its now famous production system, scheduled through very simple, reliable and convenient kanban cards, which are tags that signal to workers that more parts need to be manufactured, proved to be a much better course of action.

It's possible that ERP systems vendors will be tempted to add more functionality to their systems. Yet the companies that come out on top may be those that figure out how to simplify the enterprise information problem through organization and process design, as Toyota did.

■ Don't underestimate the attraction of cheaper, less functional technology.

Minicomputers, PCs, CAD software: Technology history has many examples of cheaper, less functional technologies that found a market, took root and went up-market as they improved. The same dynamic may be happening now, judging by the enormous interest in low-cost network computers and in Java.

Both technologies are criticized for not offering the functionality of current technology. Still, IT leaders should remember history and keep their minds and their eyes open for "smaller, cheaper, simpler" technology that can adequately meet the needs of many users.

■ Hire and promote people who value appropriate technology more than the latest bells and whistles.

Computer professionals enjoy technology. They are usually interested in the power and performance improvements that new products have to offer. But when a "technology for technology's sake" mentality takes root in an IS organization, the group can fail to meet or even respect user needs. IS managers need to find, hire, reward and promote people who find satisfaction in creating inexpensive, reliable and adequately functional systems. They should cultivate a culture that finds value and fulfillment in creating appropriate technology, not just powerful technology.

How can strategists in technology-intensive industries avoid this cycle of pursuing up-market profitability, followed by displacement by competitors who enter their industries with cheap, simple products targeted at unprofitable customers?

As they analyze their market, they should compare the rate of improvement in product functionality customers are actually using, with the rate of improvement technologists are actually forging. Typically, managers compare the performance and price of their newest products and services with those of their most direct competitors. They solicit inputs from lead customers, who often articulate needs at the high end of the markets they serve.

Too often in this race up-market, managers can lose sight of what improvements in functionality their low-end, and then their mainstream, customers actually need or can absorb. In other words, they overshoot the performance needs of their core market — making them vulnerable to an attack by a disruptive competitor from below.

Overshooting the performance needs of their core market has been at the root of the failure of many companies. This generally occurs because those providing the technology — on the supplier and the user side — are often caught listening to their leading, most demanding customers. Hence, they often miss important changes, in which simpler, more reliable and more convenient solutions are what their markets and users really need. When obeying the management commandment that we should listen to our customers, therefore, it is important that while managers seek to be led by them, they not be misled as well.

ABOUT THE AUTHOR:

Clayton M. Christensen is an Associate Professor at the Harvard Business School in Boston. His book, *The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail,* has been recently released by the Harvard Business School Press. His E-mail address is cchristensen@hbs.edu.

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NetServer LD Pro

Upgrade fever burns out user

Brett Arquette

Can everyone just stop writing software for a while? You're making my job miserable. Even if "zero administration" arrived tomorrow, I wouldn't be able to keep up with the upgrades, service packs, software bugs and interoperability problems. Let me give you an example.

Even before we finished rolling out Exchange clients, we started upgrading and installing Outlook.

We're migrating from Digital's All-In-1 to Microsoft's Exchange. We started out by choosing to install on our servers Windows NT 3.51 over NT 4.0, because the latter had just come out and was ugly.

But before we could even install Exchange, there were reports that the service packs for Windows NT 4.0 made the product stable. So we decided to upgrade our barely used NT 3.51 license to NT 4.0.

After loading NT 4.0 on our six servers, we were ready to install Exchange Server 4.0. So we started loading Exchange Client 4.0 on our users' machines. We quickly ran into problems that required more service packs, this time for Exchange.

One of the big problems that the service packs didn't solve was how to restore individual folders or files for users who run Exchange. You can back up Exchange's database and restore the whole thing if something blows.

But if you want to restore single folders or files, you must have a spare standalone server with enough disk space to hold the entire database.

After you restore the database, you have to create a new user account, create a new off-line folder, load the off-line folder onto the user's PC and synchronize to the live Exchange system.

Yeah . . . right!

So much for restoring files and folders.

But wait! One of our administrators came back from a Microsoft dog-and-pony show and said Outlook could automatically synchronize the off-line folder any time the user closed the application — ensuring that a copy of everything on the user's mailbox on the server would be saved on the user's PC. If the user ever shut down the application, that is. The administrator thought Outlook was much "cooler looking," too.

So even before we finished rolling out our 300 Exchange clients, we started upgrading user licenses to Outlook and began installations. Now I hear Microsoft plans to merge Outlook and Exchange. So what does that mean to me? What does it mean to my licenses?

It probably means upgrading my client licenses for the third time in less than a year and reinstalling the clients on 300 machines.

THE GOOD OLD DAYS

There was something to be said about the old mainframe systems. You upgraded one machine every year or so (if it needed it). If a user's terminal died, it wasn't a problem. You just threw a new one in front of him, and he was set for another three years. Licenses were a breeze. Hardware was no problem, and backup and restorations were simple and reliable.

Now I'm looking at 10 pieces of software on each client, all of which seem to get upgraded three times per year. Each application requires a license for each version and upgrade. I face the same software compatibility problems I faced on the mainframe, times 300.

So would everyone please just stop writing software and simply fix the old stuff?

Old stuff? Exchange is only two years old, and I'm calling it old stuff. Just stop. □

Arquette is manager of IS at the 9th Judicial Circuit Court in Orlando, Fla. His E-mail address is barq@iag.net.

Has the Java crusade been infiltrated?

John Gantz

Two years ago, I went on record saying there was a 40% chance that Java was a hoax. I was wrong. It's worse than that. Java has become a crusade, but sometimes I think the crusaders are marching in all directions at once.

Java — once a software language developed by a hardware company — now is a language, an array of development tools, a virtual machine, an operating system, a platform, a coffee-oriented naming convention, a must-support buzzword for vendors, and software in all varieties and flavors from all kinds of vendors.

What got me thinking about this was an ad I heard recently on drive-time AM radio. The ad was done, quite creatively, as a child's story.

The company in the story thought Java would protect its secret data. But then Dick told Jane that the company didn't have 100% Pure Java. And that was bad.

"Bad, bad, bad."

I guess all Javas are equal, but some are more equal than others.

The original premise of Java, as we know, was to do something about Microsoft. The public relations wraparound was that Java would be platform-independent, so developers could write one application (in Java) and run it on any system (with a Java Virtual Machine).

What's more, there was a good chance it would be ubiquitous. The crusade's Holy Grail.

UNITY UNLIKELY

The problem I've had buying in to the Java promise (and the genesis of my hoax quip) lies in the idea that there would ever be a single Java.

Why wouldn't different vendors do what they did to Unix and make variants that support their own approaches to the market?

The fact that we need 100% Pure Java to protect our secret data means there must be a lot of impure stuff out there.

My other problem with Java relates to applets and JavaBeans — in fact, to the very concept of software components. The basic idea is good, but who's going to catalog, maintain, test and integrate all the components out there?

Years ago, I studied the reusable software market and found it nonexistent. It was easier and quicker to build programs from scratch than from odd-shaped bits and pieces of other programs that all had to be retrofitted.

The Java crusade got its initial momentum as a reaction to heathen Microsoft. Now it's marching under its own force.

Vendor development organizations are pouring money into Java-based development tools and programs, but I fear that along the way they will introduce impurities.

100% Pure Java will become as hard to find as a unicorn.

So I have a prediction. As the Java crusade fans out — International Data Corp. forecasts almost 1 million programmers will be Java proficient by 2000 — I predict the flavors of Java will proliferate, 100% Pure Java will become as hard to find as a unicorn and the business of enterprise computing will continue to require daily stitching together of nearly incompatible parts.

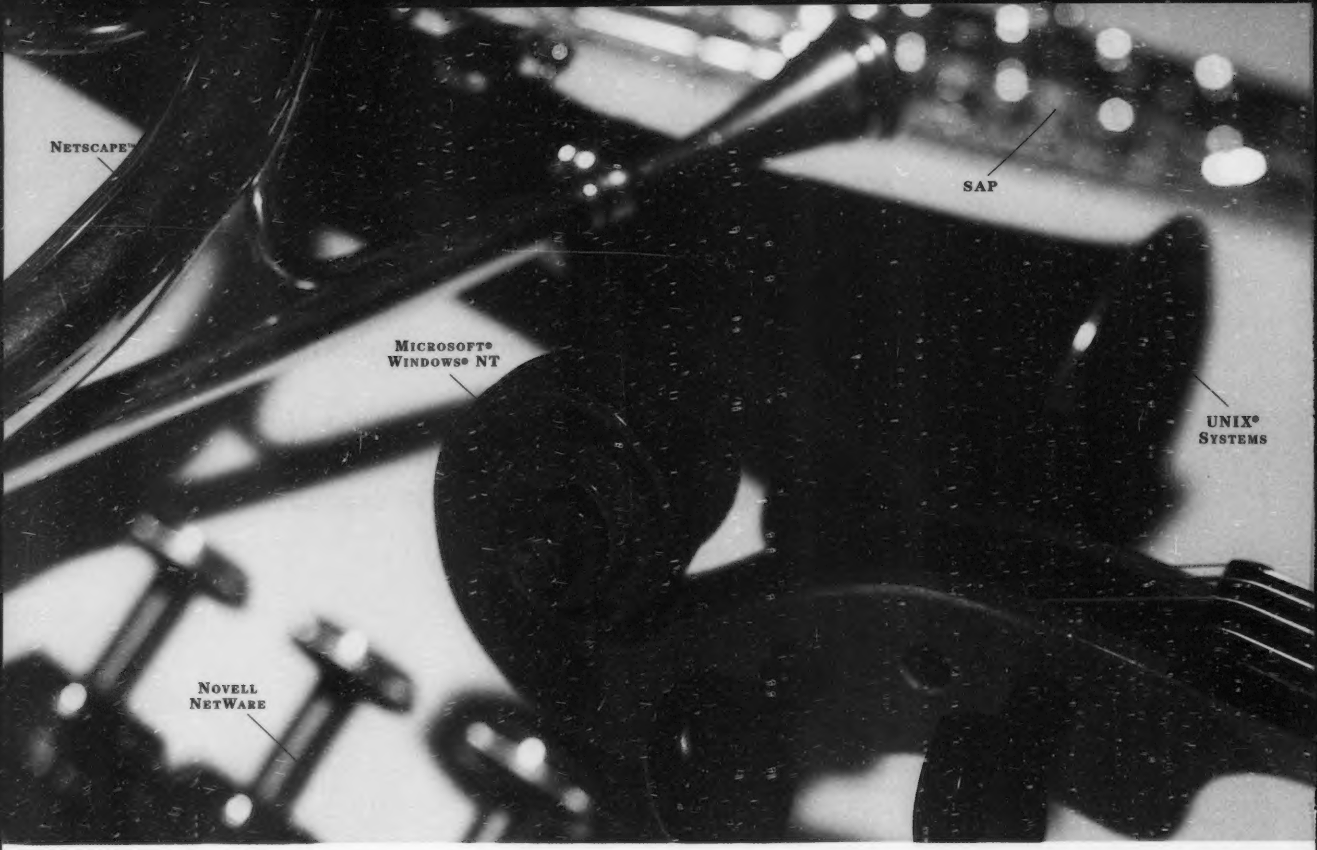
By the time Java is ubiquitous, it won't be uniform. Microsoft alone can make that prediction come true.

For corporate developers, the question is how much and how fast to invest in Java. Java skills will increase the marketability of programmers, but will they help much in developing and supporting critical business applications?

Or is Java a distraction that sucks programming talent from more important areas?

The crusaders, caught up in their own drumbeats and battle cries, probably don't have a clue. □

Gantz is senior vice president at International Data Corp. in Framingham, Mass. His Internet address is jgantz@idcresearch.com.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COMMENTARY

Telecom reform stays on track

DAVID MOSCHELLA

WHETHER OR NOT AT&T decides to make its rumored $50 billion bid for SBC Communications, it has succeeded in raising the larger question of just how well the overall process of telecommunications reform is working.

Although it's fashionable to bash the FCC and the Telecommunications Act of 1996, critics substantially underestimate the complexity of the reform challenge and the general rightness of the present course. History will show that, in this area, the Clinton administration has done very well indeed, especially when compared with other major nations.

Most of the carping has to do with how laws that were supposed to spur new competition have thus far resulted mostly in megamergers. This view is correct but shortsighted. Although the overall IT industry might feel better if — like Microsoft — the telephone companies pumped more money into cable television and wireless local loop alternatives. Major restructuring of the telecommunications players is also required.

Keep in mind that today's global telecommunications players weren't created by market forces. The U.S. Department of Justice imposed our highly unnatural local/long-distance divide, while governments around the world insisted on their national champions.

Now, U.S. telecommunications companies are being asked to create a rational competitive structure out of their fundamentally noncompetitive origins, all while keeping their shareholders happy. It's simply unrealistic to demand that they do this in precisely the manner that competitive purists would prefer. The situation is inherently messy.

Indeed, historians will look back on telecommunications reform as one of this era's most fascinating case studies. A stodgy, semimonopolistic and heavily politicized industry is being simultaneously digitized, deregulated, restructured and globalized. Mastering this trillion-dollar Rubik's Cube makes forecasting in the computer industry seem simple.

Nevertheless, the most probable result is also the most desirable one. Telecommunications industry competition is evolving toward a small number of end-to-end, global service providers. Certainly, the British Telecom/MCI deal should be viewed that way. Also, as the newly combined Bell Atlantic/Nynex and SBC/PacTel entities begin to work with global alliances such as Concert, Unisource and Global One, they too will help move the industry toward an end-to-end service structure.

In contrast, an AT&T takeover of SBC would, at least in spirit, damage the cornerstone of last year's telecommunications law, which forbids the regional Bells from getting into the long-distance market until meaningful local competition is in place. Here, the largely negative industry and bureaucratic reaction has been appropriate, even reassuring. Once again, reform instincts are on target.

So my advice to the critics is to back off. Although telecommunications reform will stumble, take surprising turns and require a decade or more, it's fundamentally on track. As long as de facto local monopolies exist, government oversight is required. We should consider ourselves lucky that, contrary to what you often hear, our political system has proved up to this most daunting of challenges. □

Moschella is senior vice president of research at Computerworld, Inc. His Internet address is david_moschella@cw.com.

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MMX™ intel inside pentium® II

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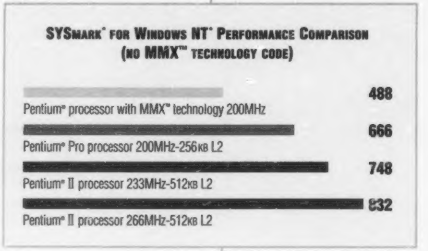
The new Intel Pentium II processor. It's everything you need for your next chapter in desktop computing. To find out more, visit our Web site.



► www.intel.com/PentiumII

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†As compared to Pentium® processor-based systems without Dual Independent Bus architecture as measured by the SYSmark* for Windows NT* Performance Comparison (no MMX™ technology code).

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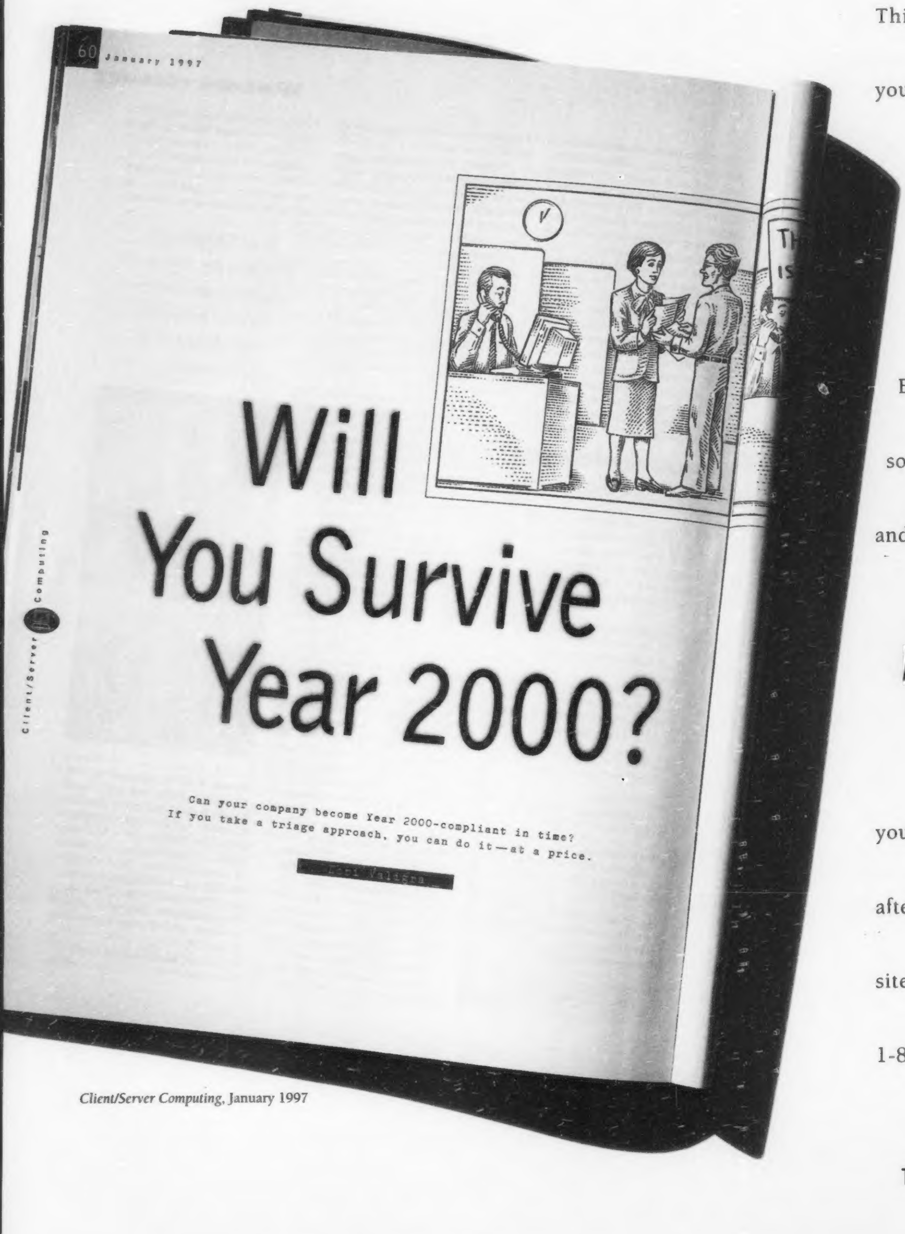


60 January 1997

Client/Server Computing

Will You Survive Year 2000?

Can your company become Year 2000-compliant in time? If you take a triage approach, you can do it—at a price.

Lori Valigra

Client/Server Computing, January 1997

Corporate Strategies

Case Studies • Trends • Outsourcing

Briefs

Women's buying power

Businesses owned by women will make about $50 million in computer-related purchases this year. And 39% of business influencers — those who are involved in the purchase of computers and network-related products for their organizations — are women, according to a study by Women in Technology International in Santa Clara, Calif.

Mellon/MCI venture

Mellon Global Cash Management, a unit of Pittsburgh-based Mellon Bank Corp., is planning a joint venture with MCI Systemhouse to provide customers with accounts payable and accounts receivable business process outsourcing services. Using Oracle Corp.'s Application software, the venture will process transactions, post payables and receivables, and update customers' general-ledger systems.

E-schoolhouse

Software that would put training programs into the equivalent of a one-room schoolhouse is being offered by Gartner Group Learning, Inc. in Stamford, Conn. The firm has released a browser-based application that will give employees access to all of a company's training programs.

MANAGERS' MINDS AT WORK

Of the managers surveyed:

62%	use less than half their brainpower on the job
40%	second-guess subordinates and reverse their decisions
48%	jump from subject to subject during meetings
45%	who make decisions choose their boss's favorite alternative

Base: 641 supervisors and managers across all industries

Source: Kepner-Tregoe, Inc., Princeton, N.J.

Bookseller site weds Web to legacy systems

By Jaikumar Vijayan

SOMETHING OLD, something new, something marked down, something from the best-seller list.

ELECTRONIC COMMERCE

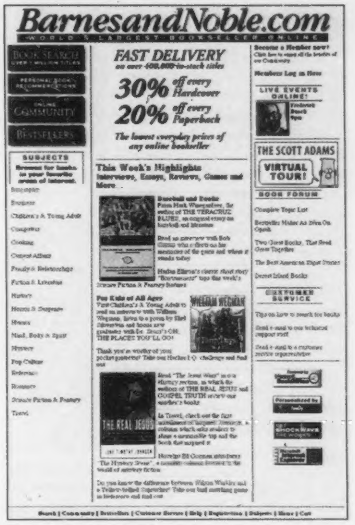
A marriage of Unix and Windows NT technologies is helping bookselling giant Barnes & Noble, Inc. deliver some new capabilities via the World Wide Web.

The New York-based retailer is heavily leveraging the technology and expertise it uses in many of its 439 superstores nationwide to quickly get going in a business in which upstart Amazon.com has been grabbing much of the attention recently.

Barnes & Noble, the country's largest book retailer, last month set up an online subsidiary called BarnesandNoble.com to sell books on the Web.

The company's site, which comes almost two years after Amazon.com's launch, gives customers several features, including personalized book recommendations based on a user's profile; online, live auditoriums with authors; book groups; book reviews; and bulletin boards.

"We wanted to create a totally new experience in terms of purchasing books online," said John Kristie, vice president of Internet services at BarnesandNoble.com in New York. "But it was important for us to leverage our existing technologies and knowledge base" while doing so.



The site is "a totally new experience in terms of purchasing books online," says BarnesandNoble.com's John Kristie

Most of the database information for the site — things such as title and author information, for example — already exists on Barnes & Noble's Unix servers for use by its bookstores.

Much of the same information has now been made available on the Web. And Barnes & Noble is porting to its Web site some features, such as author and book title searches, that were developed for in-store use, and others, such as order processing services, that were developed for a merchandising data warehouse.

To handle some of the hardware scalability, reliability and fault-tolerance requirements for a 24-hour site, the company decided to use what it calls a "modular distributed approach" to developing the platform.

Instead of relying on a few large servers to power its entire

Bookseller, page 42

Field service application helps utility to compete

By Thomas Hoffman
NEWARK, N.J.

AS DEREGULATION in the gas and electric power industries draws near, forward-looking utilities such as Public Service Electric & Gas Co. (PSE&G) are using information technology to differentiate their customer service capabilities from the competition.

At PSE&G, which serves more than 2 million customers in Northern New Jersey, the focus is on a field service system that gives repair staff fast information about customers' service records.

The company's project comes against the backdrop of broader changes. The company must guard against new competitors seeking to repair the gas appliances in a franchise area it has tightly controlled. And PSE&G can find new opportunities by repairing electrical appliances, from water heaters to kitchen equipment.

PSE&G officials recognized that the company would need new systems to help it differentiate customer service in the appliance repair business. But be-

Service app, page 42

Andres Jiminez says he loves the information management system for PSE&G's repair crews

THOMAS HOFFMAN

College gets help, students learn network

By Julia King

STUDENT LABOR may be cheap, but technology managers at California State University at Hayward have figured out a way to get it absolutely free.

In exchange for analyzing data from the campus' 2,000-node Ethernet network, students in the school's new telecommunications program receive hands-on experience with state-of-the-art network management tools.

The university, meanwhile, saves tens of thousands of dollars in employee salary and training costs. It also reaps key strategic planning benefits from regular network performance checks.

"With a limited [full-time networking] staff, we just don't have the resources to be poring over performance data and looking in a more proactive way for potential problems," said John Charles, director of information and computing services.

Students' free labor helps the school – and their grades.

Students, on the other hand, usually have both the time and the incentive. Identification of network bottlenecks and their causes is part of their Internet and client/server systems course curriculum, so tracking down problems can help boost their grades. Students also tap in to the system to gather statistics for special research projects.

College, page 42

College monitors network as students gain experience

CONTINUED FROM PAGE 41

Also, Charles plans to award an as-yet unspecified prize each academic quarter to the student who makes the most useful recommendations for improving network performance.

Students use the Internet to access campus network data, which is generated and archived for the university by International Network Services (INS), a third-party network services provider in Sunnyvale, Calif.

Vital data is stored on an intranet-based server, which students can access via any browser. The cost of the service, which the university has been using since November, is about $20,000 annually, Charles said.

"One of the greatest advantages of this service is that you can access it remotely and share it with students," said Alex Bordetsky, a telecommunications professor. "INS provides detailed analyses of loads on servers, the number of messages or tasks waiting in queue and other measures, all of which fall under performance management, which is one of the major functions for any telecommunications manager."

California State's John Charles says the school is short on resources

Among other things, students' analyses will be used to implement several switched Ethernet hubs during the next two years. Without their help and the INS service, the project would take much longer, said Kent McKinney, director of information systems.

"One reason we went with a service is that it's faster [than an in-house monitoring system] to implement, and it's more cost-effective," McKinney said. □

Service app helps utility to compete

CONTINUED FROM PAGE 41

fore that could happen, PSE&G had to get a working system.

A first attempt to establish a remote field service system failed (see story at right).

In 1993, PSE&G relaunched its gas service information management system (GSIMS). This time, with help from software developer Sapient Corp., PSE&G got 400 dispatchers, customer service representatives and field service technicians involved before the first applications were built.

THE CUSTOMER ISN'T A METER

Systems such as GSIMS are fundamental for utilities to compete in a deregulated market, said David Cain, a manager at the Electric Power Research Institute, an industry think tank in Palo Alto, Calif. Utilities "are seeing that the customer is no longer a meter, but a client to win or lose," he said.

At PSE&G, users were asked what they wanted the field system to do for them. Field service technicians, for example, said they wanted to know if another repairman had serviced a customer's appliance in the immediate past. In all, some 400 end users lent their input to GSIMS before rollout was completed in November, said Chris Davey, vice president of sales at Sapient in Cambridge, Mass.

PSE&G saw an opportunity to expand its reach beyond the residential gas appliance service market and add commercial and residential electrical appliances. Their addition is expected to help PSE&G double its appliance service business by 2001, said Greg Player, manager of business operations at the utility.

A diagram of failure

In the early 1990s, PSE&G tried to deploy a wireless field service system designed to provide its repair crews with a full history of work done at each customer site. But the system failed for a variety of reasons, including these:

- **The post-card-size screens were hard for field service technicians to read.**
- **The utility tried to design the software around preselected hardware, an engineering no-no.**
- **The radio frequency-based system didn't work properly over the airwaves, said Greg Player, manager of business operations at the utility.**

Perhaps more telling, the system was force-fed to users by senior management and the IT department without end-user buy-in.

— Thomas Hoffman

Like other PSE&G technicians, Andres "Murphy" Jiminez was skeptical about having to use a computer in his truck. The 18-year veteran repairman had scant computing experience and had grown accustomed to calling in to a dispatcher to hear a customer's service history.

Now Jiminez can see that information for himself on his pen-based terminal. The system tells Jiminez what previous repairmen did at each customer's site. "I love it — I've got a full history of everything I need," he said.

The system, which analysts estimated to have cost $15 million to $20 million, has delivered other benefits. In the first quarter this year, 35,000 gas leaks were reported throughout New Jersey. When gas leaks are reported, the New Jersey Board of Public Utilities requires utilities to respond within an hour.

Before GSIMS, PSE&G was achieving only a 98% response rate within an hour of gas leak reports. Information about the leaks had to be gathered, printed out and assigned to technicians.

The new system enabled PSE&G service technicians to respond to 99.6% of its customers within an hour, or 560 more customers than it would have been able to before GSIMS, said Greg Player, business operations manager at PSE&G. □

Bookseller

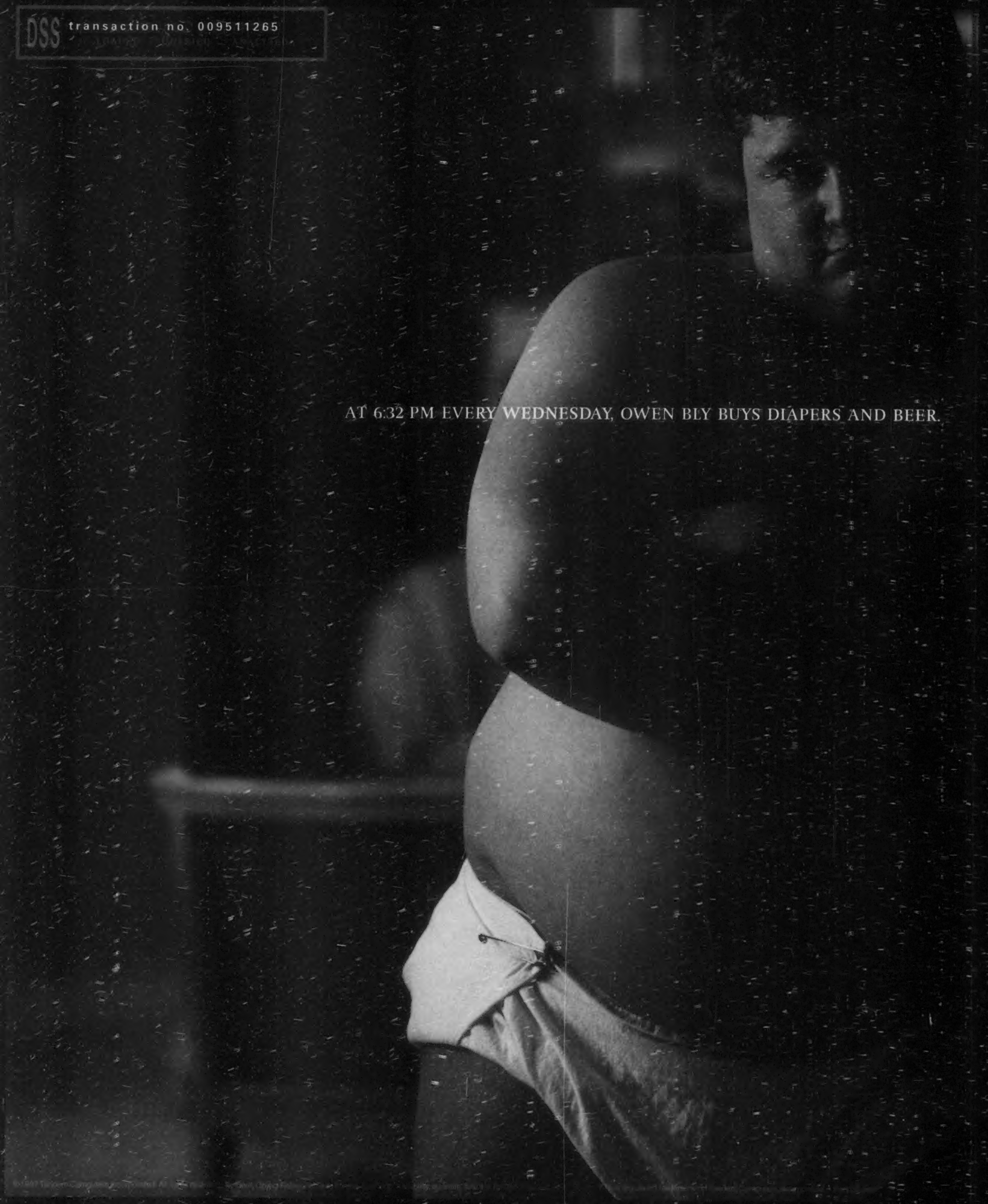
CONTINUED FROM PAGE 41

site, for example, Barnes & Noble has built a "Web farm" that consists of several Unix and Windows NT servers. By distributing applications across several servers — and then duplicating them in geographically dispersed mirror locations — the firm hopes to minimize the risk associated with unexpected hardware downtime. That gives Barnes & Noble flexibility to grow the system if the need arises.

For example, the company is using seven Intel Corp.-based servers from Hewlett-Packard Co. that run Windows NT and Microsoft Corp.'s SQL Server to drive its Web site's title search engine alone. Having multiple servers run the same application lets Barnes & Noble balance the load imposed on the system by concurrent users.

The NT servers are linked to HP 9000 Unix servers that run applications that handle ordering, shipping and customer electronic mail.

"With Web commerce, you are looking at a situation where some of the usual issues relating to capacity planning and scalability become greatly amplified" compared with other commercial applications, said James Garden, an analyst at Technology Business Research, Inc. in Hampton, N.H. □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The Internet

The World Wide Web ♦ Intranets ♦ Online Services

Briefs

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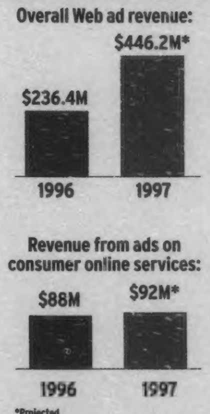


*Projected

Source: Cowles/Simba Information, Stamford, Conn.

From virtual to real

It's pretty common for brick-and-mortar businesses to launch an online presence, but how about the other way around?

Online bookseller CBooks Express in Sunnyvale, Calif., last week announced it is buying Computer Literacy Bookshops, Inc. in San Jose, Calif., with stores in Silicon Valley and Tysons Corner, Va.

CBooks Express said it acquired the shops so it could sell books in cyberspace and in bookstores.

Web server software

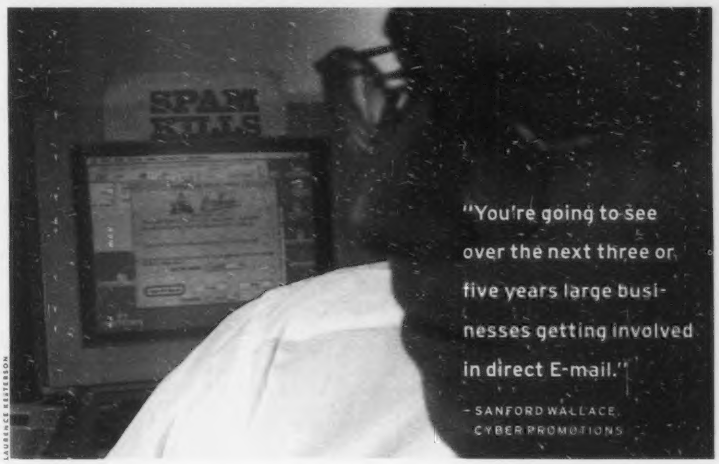
VirtuFlex Software Corp. in Cambridge, Mass., last week released the latest version of its VirtuFlex cross-platform software. VirtuFlex 2.0 lets developers build and test applications locally and ensures that they will operate in the same manner as they will on any World Wide Web server hosted locally or remotely.

VirtuFlex 2.0 has been updated with features such as Web-based administration screens, debugging utilities and functions for processing forms on Web pages.

The 32-bit Windows version of VirtuFlex 2.0 costs $495. A stand-alone Unix version costs $2,495.

Wallace: The king of spam

▸ *Not everyone hates junk E-mail*



"You're going to see over the next three or five years large businesses getting involved in direct E-mail."

– SANFORD WALLACE, CYBER PROMOTIONS

LAURENCE KESTERSON

The man who gets the blame for much of the junk electronic mail, or "spam," on the Internet is Sanford Wallace, 28, president and founder of Cyber Promotions, Inc. in Philadelphia.

Distributing spam is Cyber Promotions' business. And being attacked is just part of a regular day for "SPAMford."

The company has been the target of E-mail bombs that have knocked out the computer systems, and lawsuits that have cost tens of thousands of dollars to settle. The company also has inspired proposed laws designed to curb or ban spam. A federal judge last month ruled that Cyber Promotions' E-mail to subscribers of EarthLink Network, Inc. constituted trespassing on EarthLink's systems.

But not everyone on the Internet is an enemy of the company. Wallace said Cyber Promotions has 9,000 customers and expects to earn $3 million to $5 million in revenue this year, up from $800,000 last year. Computerworld *senior editor Mitch Wagner recently spoke with Wallace in a telephone interview.*

CW: Isn't a company that sends out spam inviting all sorts of attacks — mail bombs and hacker attacks?

WALLACE: I guess you could say MCI [Communications Corp.] invites hacker attacks when they call you in the middle of the night [asking you] to switch long-distance compa-

The king of spam, page 49

Users applaud Domino effect

▸ *Lotus add-ons help Notes sites quickly set up Web sites, E-commerce apps*

By Barb Cole-Gomolski

NOTES SITES are giving Lotus Development Corp.'s line of prewritten Internet applications high marks, saying they can help users quickly churn out applications that require little follow-up administration.

"[Developing] any of these applications from scratch would be a lot more work," said Jay Ramsperger, a groupware project leader at Carlson Cos. in Plymouth, Minn.

Lotus recently began to sell three add-ons for its Domino server — one for setting up a World Wide Web site, another for creating online commerce applications and a "push" application that pumps out information to Domino users (see chart below).

The applications were announced in December and have been shipping since the first quarter.

Lotus hopes to expand the reach of Domino.Merchant with links to IBM's enterprise-scale electronic-commerce system.

The software is an attempt by Lotus to address long-standing criticism that Notes applications are difficult to implement, said Stephen Morse, an analyst at The Burton Group, a research firm in Salt Lake City. He said large Notes sites have dealt with development demands by building a supply of in-house experts.

"So these [prewritten] applications may appeal more to small shops — the people who have

Users applaud, page 49

THE DOMINO.APPS FAMILY

Application	What it does	Price
Domino.Action	Creates Web sites	Ships free with Domino Server
Domino.Merchant	Builds online commerce applications	$1,295
Domino.Broadcast	Sends content, such as applications, text, video and plug-ins to Domino users	$1,295

Web access to Windows applications

By Lisa Picarille

USERS WHO WANT to protect their investment in Windows applications while using the World Wide Web to share software may soon get a new option from start-up Epicon, Inc.

The Waltham, Mass.-based firm this fall plans to ship Altis, a Windows-based client/server application that lets users access server-based Windows applications using a Web browser.

It was designed to save time and bandwidth by feeding users only the parts of a Windows application they need. With a word processor, for example, it might load only the text editor, not the spell checker or layout tools.

That would give users almost immediate execution of the applications on their desktops because there would be less code to execute.

Users beta-testing the product, who asked not to be identified, applauded the prospect of being able to use their internal network as well as the Internet to help reduce the cost of man-

Web access, page 49

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- 10. Manufacturer (other than computer)
- 20. Finance/Insurance/Real Estate
- 30. Medical/Law/Education
- 40. Wholesale/Retail/Trade
- 50. Business Service (except DP)
- 60. Government - State/Federal/Local
- 65. Communications Systems/Public Utilities/Transportation
- 70. Mining/Construction/Petroleum/Refining/Agriculture
- 80. Manufacturer of Computers, Computer-Related Systems or Peripherals
- 85. Systems Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
- 90. Computer/Peripheral Dealer/Dist./Retailer
- 95. Other__________ (Please Specify)

2. TITLE/FUNCTION (Circle one)

IS/MIS/DP MANAGEMENT
- 19. Chief Information Officer/Vice President/Asst. VP IS/MIS/DP Management
- 21. Dir./Mgr. MIS Services, Information Center
- 22. Dir./Mgr. Network Sys., Data/Tele. Comm., LAN Mgr./PC Mgr., Tech. Planning, Administrative Services
- 23. Dir./Mgr. Sys. Development, System Architecture
- 31. Programming Management, Software Developers
- 41. Engineering, Scientific, R&D, Tech. Management
- 60 Sys. Integrators/VARs/Consulting Management

CORPORATE MANAGEMENT
- 11. President, Owner/Partner, General Mgr.
- 12. Vice President, Asst. Vice President
- 13. Treasurer, Controller, Financial Officer

DEPARTMENTAL MANAGEMENT
- 51. Sales & Mktg. Management
- 70. Medical, Legal, Accounting Mgt.

OTHER PROFESSIONAL MANAGEMENT
- 80. Information Centers/Libraries, Educators, Journalists, Students
- 90. Other Titled Personnel

3. Do you use, evaluate, specify, recommend, purchase: (Circle all that apply.)

Operating Systems

(a) Solaris	(e) Mac OS
(b) Netware	(f) Windows NT
(c) OS/2	(g) Windows
(d) Unix	(h) NeXTstep

App. Development Products ☐ Yes ☐ No
Networking Products ☐ Yes ☐ No
Intranet Products ☐ Yes ☐ No

4. Which of the following products do you buy, specify, recommend or approve the purchase of? (Check all that apply.)
(a) ☐ Internet software
(b) ☐ Internet browsers
(c) ☐ Web authoring/development tools

5. Do you use the Internet? ☐ Yes ☐ No

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- 50. Business Service (except DP)
- 60. Government - State/Federal/Local
- 65. Communications Systems/Public Utilities/Transportation
- 70. Mining/Construction/Petroleum/Refining/Agriculture
- 80. Manufacturer of Computers, Computer-Related Systems or Peripherals
- 85. Systems Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
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3. Do you use, evaluate, specify, recommend, purchase: (Circle all that apply.)

Operating Systems
(a) Solaris (e) Mac OS
(b) Netware (f) Windows NT
(c) OS/2 (g) Windows
(d) Unix (h) NeXTstep

App. Development Products ☐ Yes ☐ No
Networking Products ☐ Yes ☐ No
Intranet Products ☐ Yes ☐ No

4. Which of the following products do you buy, specify, recommend or approve the purchase of? (Check all that apply.)
(a) ☐ Internet software
(b) ☐ Internet browsers
(c) ☐ Web authoring/development tools

5. Do you use the Internet? ☐ Yes ☐ No

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The king of spam

CONTINUED FROM PAGE 45

nies. This is a new medium, and there are a lot of people out there who take a vigilante approach to fighting [spam]. But if people want to fight this type of activity, they should fight it in the courtrooms or in the law process. Not by sending E-mail bombs, or by threatening or by any other things they encourage on many of the newsgroups.

CW: How do you guard against becoming a target for mail bombs and hacker attacks?

WALLACE: Due to the fact that we've dealt with so many attacks in the past, we have developed a security system that has been effective. Our systems haven't been compromised in over a month, which is for us a very big accomplishment.

CW: Do you think a big business should look at spam as an advertising tool?

WALLACE: I think that large businesses are waiting on the sidelines right now. You're going to see over the next three or five years large businesses getting involved in direct E-mail. Large businesses have to look into developing a database of E-mail addresses of qualified recipients. That's the way they should start out, the safe way, the smart way. General Motors cannot afford to take any chances on a new medium like this. It's just too early.

CW: How does a large business develop a database of E-mail addresses of qualified recipients?

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For these and other related links, point your browser at *www.computerworld.com/links/970616spamlinks.html*

- **Fight Spam on the Internet! *www.vix.com/spam/***
- **The Netcheck Commerce Bureau position on unsolicited E-mail *www.netcheck.com/spam.htm***

WALLACE: If you look at our service, it's very clean because we prequalify. We have a primary mailing list of 2.2 million people. We sent E-mail to these people every day for the last two years. The individuals who don't want to receive the mail anymore have had the opportunity to hit the "reply" button and type "remove" hundreds of times. So now when people advertise to our main list, they don't get flames, and they don't get angry responses. They only get good responses.

CW: You had a court ruling that said you were trespassing on EarthLink.

WALLACE: The court said that sending unsolicited E-mail into EarthLink after they had sent a cease and desist [order] was considered a trespass. We were very upset with that. When you go and get a Mail Boxes Etc. account and someone sends you junk mail, not only is it not trespassing, but it would be against the law if Mail Boxes Etc. decided to take that mail and throw it away or send it back. If you look for a parallel, that's the thing that I would think of.

CW: Why do you think people get so mad at you?

WALLACE: There are people out there who just hate getting advertisements in their E-mail box. And we are the largest purveyor of this type of E-mail, so I think we really hit the right nerve.

CW: Can you see a point where this kind of E-mail will become accepted and a normal way for companies to do business?

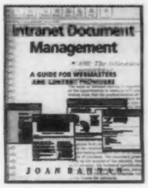
WALLACE: Yes. When we started this business, everybody said, "Nobody wants this garbage. Everybody's going to throw you off the Internet. You're going to be out of business in a month." And here we are, three years later, still plugging away. And our numbers are jumping higher than ever. Sometimes it takes time to convert people to accept a new advertising medium. But that trend is developing quickly. □

BOOK REVIEW

Intranet basics

Intranet Document Management, A Guide for Webmasters and Content Providers
By Joan Bannan
Addison-Wesley Developers Press, Reading, Mass., $29.95, 295 pages (paperback)

Most webmasters will probably already know what is in this book — and a whole lot more. On the other hand, content providers and Internet newbies who have little technical background can use this guide to learn about most of the basic elements of building an intranet.


Intranet Document Management
A GUIDE FOR WEBMASTERS AND CONTENT PROVIDERS
JOAN BANNAN

The book is also mistitled. It doesn't delve into document management until the last three chapters. The first eight chapters are devoted to Internet fundamentals, including how your company could benefit from an intranet, security issues and design tips — all very large topics that have books devoted to them alone.

So if it's heavy-duty document management information you are looking for, this probably won't fit the bill until the author discusses "Managing large documents" and "Managing large collections of documents" near the end.

But there is a lot of practical advice about uploading files to a World Wide Web server, how to organize and save electronic mail for future reference, reading "legacy" files from a browser, and so on. And there are lots of definitions in here — almost too many, in fact — for everything from File Transfer Protocol and Post Office Protocol to bandwidth and the Web. This adds to the "primer" look and feel of the book, and it disrupts the flow of the information the writer is trying to convey.

Still, if you are trying to come up to speed on the Internet quickly, you could do worse.

There is an appendix with a whole raft of uniform resource locators that could help even experienced Internet users or webmasters get more information about specific topics, including where to find a list of all the file formats found on the Internet and an image map scripts test page. That alone could be worth the price of the book. — *Johanna Ambrosio, Online Editor, @Computerworld*

Users applaud Domino add-ons

CONTINUED FROM PAGE 47

traditionally been intimidated by Notes," he said.

Users who built their own applications probably will have to choose between keeping them or moving to the add-ons.

"I was pretty impressed with what you can do out of the box," said an architect at a large consulting firm that is deploying Domino.Action and Domino.Merchant. "The process for managing the Web site is already baked into the product, which is great," said the architect, who requested anonymity. But the firm had extra work when it tried to integrate its proprietary back-end system with Domino.Merchant, he said.

Lotus' business partners seem to be more familiar with the applications. Several large sites said they are beginning to eye the applications now that their upgrades to Domino 4.5 are complete. Tamer Selim, Internet technology director at Virtual Intelligence Corp. in St. Paul, Minn., said he sees benefits for large IS organizations and small sites. Domino.Action, the application that constructs a Web site, can be used as a prototyping tool, Selim said.

SOME LIMITS

"Once a Web site is constructed, end users are able to update their own content, without the assistance of IS," Selim said. He has installed the applications in divisions of large companies that have used them as the basis for a departmental intranet.

Although the apps are a welcome head start for Notes shops, they still have limitations, users said. Developers are still restricted in the way they design Web forms. And it can be tougher to find a 'net service provider to host your Domino application than it would if the product were written in pure Hypertext Markup Language, users said. □

Web access to Windows applications

CONTINUED FROM PAGE 47

aging and deploying software.

They said Altis will let them more quickly update software without having to deploy the new versions on each desktop and leverage existing Windows applications.

Altis also is aimed at users developing electronic-commerce solutions, and online services that want customized interfaces but don't want to force customers to download an entire customer-service application before they can place an order.

Existing Windows applications don't need to be rewritten because Altis acts only as a conduit to feed users the pieces of the applications they need.

Altis addresses two key issues in distributed computing — application availability and total cost of ownership — by loading only a minimal amount of code on a client PC, said Michael Goulde, an analyst at Patricia Seybold Group, a market research firm in Boston. That makes it possible to distribute applications with little incremental cost per PC, he said.

BENEFITS OF EPICON'S ALTIS SOFTWARE

- **Delivers only the piece of the application needed and delivers it over the Web**
- **Executes application immediately**
- **Updates software without having to deploy it to every desktop**
- **Preserves investment in client/server applications while using the Web to access applications**

The software comes in pieces to run at both the client and server. The server-based Administrator program includes Enabler, a Windows-based utility that automatically determines the structural makeup of an application. Enabler then creates a file of that application's structure. It provides the instructions for the client piece of Altis to run that software based on where the Windows application's individual components are stored.

Altis is due in the third quarter. Pricing hasn't been determined. □

With the right protection, the century change isn't nearly so frightening.

Briefs

Fast Ethernet hubs

Cisco Systems, Inc. last week announced additions to its line of 100M bit/sec. Fast Ethernet hubs. The San Jose, Calif., vendor unveiled FastHub 216T, which has 16 managed 100M bit/sec. ports. It costs $149 per port and is shipping now. FastHub 116T has 16 unmanaged ports. It costs $89 per port and will ship next month. Cisco also reduced the price of its older FastHub units up to 14%.

Groupware tool kit

This week at PC Expo '97, InfoImage, Inc. in Phoenix will announce Instant I-Net 97 Developer's Version, a tool kit for building groupware applications on Lotus Development Corp.'s Domino servers. The software comes with prewritten application components and sample databases to help speed development. Instant I-Net 97 costs $1,750 per server.

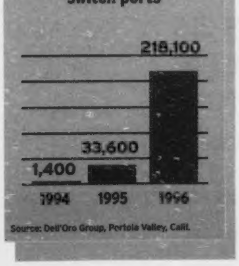
Have NT, will travel

Traveling Software, Inc. in Bothell, Wash., last week released LapLink For Windows NT 4.0, remote access software. LapLink supports user profiling and defined access rights to administer and secure access to NT systems. It costs $149.

Software distribution

LANovation, Inc. in Minneapolis shipped an update to its LAN Escort 4.1 software distribution application. The new version lets network managers automatically roll out and update software and troubleshoot and fix Windows and applications problems. Pricing starts at $1,250 for 50 users.

Shipments of Token Ring switch ports



Source: Dell'Oro Group, Portola Valley, Calif.

LAN gear must go!

▸ *Crowded internetworking market forces vendors to give users deep discounts, price cuts*

By Bob Wallace

YOU DON'T LIKE the price of internetworking hardware? Wait a few weeks. You may not even need friendly persuasion to get a price break.

Price reductions and deeper discounts are becoming a broad trend in the internetworking market as an overcrowded industry fights for a limited customer pool. And users are reaping the benefits.

Firms can save money as they introduce newer, more advanced and more efficient technology in their enterprise networks. And that lets those firms relocate the equipment they replace to needy remote offices.

"We've taken advantage of this to deploy switched Ethernet to the desktop," said Peter Pollack, vice president of new technology and architecture at Showtime Networks, Inc. in New York, a Viacom, Inc. unit. "It's an opportunity to get other technologies like Fast Ethernet into your network faster, also."

Showtime's Peter Pollack:

"We tell our vendor what the competition is offering, and they always match it"

Users can now expect from the largest vendors a 25% to 30% discount off list prices, said Esmerelda Silva, an analyst at International Data Corp., a research firm in Framingham, Mass.

To compete, second-tier vendors have to cut up to 50% off last year's list prices, she said.

FLOODED MARKET

Why the deep discounts? Despite rampant consolidation, there are still more than 70 vendors making LAN switches, according to a recent estimate by The Yankee Group, a consulting and research firm in Boston.

"The sheer size of this market has made price cuts and discounting the order of the day in the internetworking industry," said Eric Hindin, an analyst at The Yankee Group. "There's a real opportunity for users to save big in this environment. And it'll get better."

Price cuts and discounts aren't restricted to LAN switches. Vendors are battling for business on other fronts, including adapter cards, hubs and routers. The same is happening

Internetworking, page 54

Tools see R/3 from user view

By Patrick Dryden

UNDER PRESSURE to assure prompt service to internal users, information systems managers are seeking a user's-eye view of the performance of critical client/server applications.

Two vendors are trying to overcome shortcomings in existing tools by measuring response times from the clients themselves, starting with SAP AG's R/3 applications.

Start-up Luminate Software Corp. in Redwood City, Calif., launched its entry last week at SAP's European user conference. Candle Corp. in Santa Monica, Calif., this month expects to ship its first response-time monitors for R/3 and other applications.

"Traditional performance mon-

User view, page 54

CORPORATE E-MAIL

New software may ease in-box anxiety

By Sharon Machlis

WHEN WENDY KOTKOSKY got married recently, she faced the daunting task of telling countless business associates her new surname and E-mail address.

But instead of notifying them herself, she let her electronic-mail software do the work, creating a rule in Lotus CC:Mail that forwarded messages to her new address and sent back an automated response explaining her new identity.

"That saved me a whole lot of time and headaches," said Kotkosky, manager of project automation services at architectural and engineering company Fluor Daniel, Inc. in Irvine, Calif. "Otherwise, I would have had to personally write

Software, page 55

Users block out Novell's white noise

▸ *Turmoil doesn't scare NetWare users — yet*

By Laura DiDio

USERS ARE concerned but not panicked about the ongoing tumult at Novell, Inc.

Information systems managers at large Novell NetWare shops said they remain confident Novell will deliver the directory services, cross-platform integration products and World Wide Web services they need, despite the company's continuing financial woes, management shake-ups and layoffs.

But that confidence contrasts sharply with their concerns about NetWare's long-term viability as their primary network operating system.

"I'm not happy to hear about Novell's woes," said Mike Jayjock, manager of risk assessment and a senior research fellow at Rohm and Haas Co. in Philadelphia. "But that doesn't change our feeling that NetWare still dominates as an enterprise [network operating system]. We have 180 NetWare servers companywide, and we're married to Novell Directory Services."

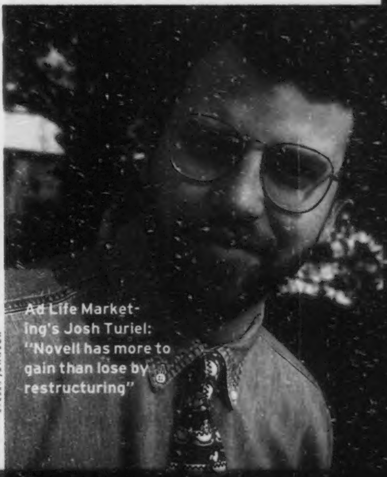
SLOW SLIDE

Provo, Utah-based Novell three weeks ago stunned analysts by reporting a $14.6 million loss for its second quarter in fiscal 1997 rather than the slight profit analysts had expected. On the heels of the shrinking financials, Novell also said it would restructure the company and lay off 18% of its workforce — about 1,000 people.

Then, 10 days ago, Joe Marengi, a nine-year Novell veteran who has served as the company's president and chief operating officer since last September, announced his resignation, effective at the end of this month.

"Anyone who's already com-

Novell, page 55



STELLA JOHNSON

Ad Life Marketing's Josh Turiel: "Novell has more to gain than lose by restructuring"

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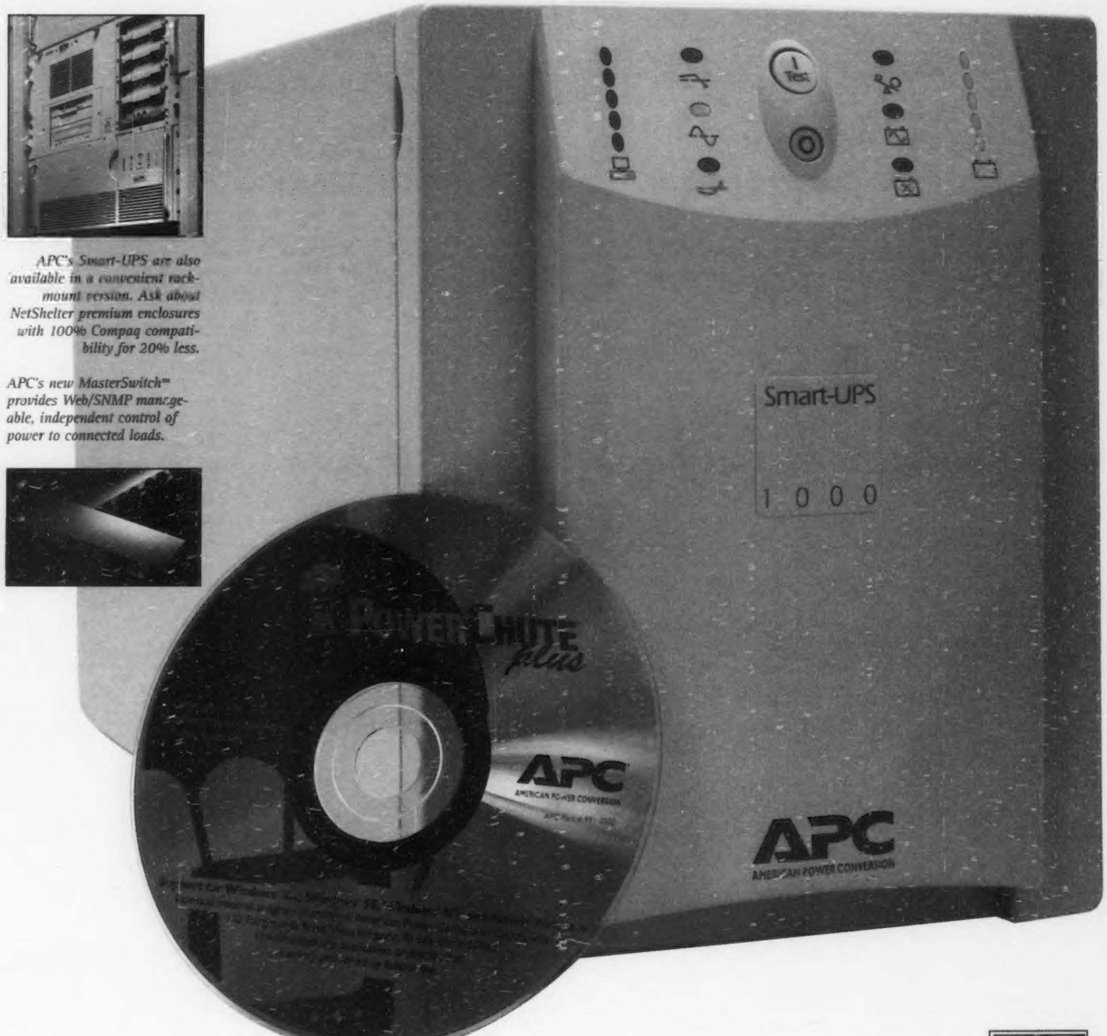

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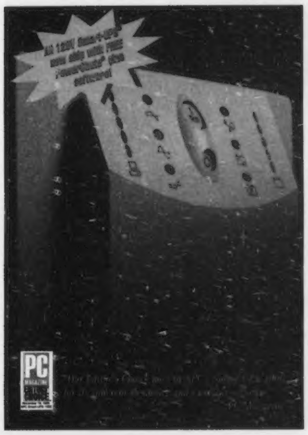
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1000	SU1000NET	11	$699
1400	SU1400NET	21	$879
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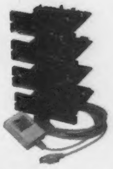
3000	SU3000NET	46	$2599

*Runtime w/ Proliant® 2000/4000/4500R shown **Includes PowerChute plus power management software



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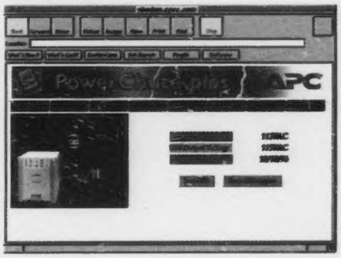

PowerChute plus *provides unattended system shutdown and UPS management for Windows NT, Netware and other operating systems. Manage your APC Smart-UPS via SNMP, DMI and Web browsers (shown above). Features vary by operating system.*

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*source: InfoWorld 1996

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Internetworking

CONTINUED FROM PAGE 51

with remote access systems.

"This means we can introduce newer and more advanced technologies into our networks faster and less expensively," said Joe Askins, director of data communications at Arizona State University in Tempe. The college is a large Cisco Systems, Inc. shop. "It's a smart move for users and vendors," Askins said.

But what makes things tough for vendors and intensifies price competition for users is that users rarely throw away their equipment in favor of new gear. Older equipment doesn't die, it is just relocated.

"We shift older equipment, like hubs, to remote offices as we install LAN switches," said Mike Bannon, communications manager at Mercy Health System of Southeast Pennsylvania, a large 3Com Corp. customer in Bala Cynwyd, Pa. "This saves us money by delaying the need to buy new equipment for these smaller offices."

Internetworking vendors often run upgrade programs and related promotions to get users to move to more expensive and newer equipment. But users rarely cash in on them if they aren't already poised for an upgrade, analysts said.

Although it is always a big factor, price isn't the only criterion when selecting an equipment vendor. And sometimes deep discounts come too late in the process.

"Once a competing vendor learned [we] had decided to go with one of their competitors, their senior management got on the phone and cut their bid in half," said a network manager at a Northeastern hospital, who requested anonymity. "But we'd pretty much made our decision, and we rated the vendor we chose higher on technology," he said.

Pollack said users don't have to sacrifice price in big buys. "If need be, we tell our vendor what the competition is offering, and they always match it," he said. □

User view of R/3

CONTINUED FROM PAGE 51

itoring tools didn't help us determine how productive users could be with our suite of R/3 applications," said Mike McCoy, manager of information systems at FileNet Corp. in Costa Mesa, Calif.

Central operators could see snapshots of utilization for the application and database servers, McCoy said. But they would have to translate system, network and application statistics before they could determine how well the vital business functions performed, he said.

Autodesk, Inc. was in the same predicament. "No comprehensive tool could let us see from a desktop all the way back into the servers hosting the applications," said Dave Reclite, a systems administrator at Autodesk in San Rafael, Calif.

Both companies tested Luminate for SAP R/3, which gathers performance details from a PC at each business unit, and from agents on servers. Its data mart converts measurements and technical details to management-level summaries. Those explain availability, response time and work accomplished by transaction type for each application and user group.

McCoy said he can track the experiences of users on campus and at six international sites and can supply meaningful reports to end-user organizations.

Reclite said Luminate provides good graphical representation of data that was previously hard to get. Its baseline for network and system response times "lets us detect bottlenecks before they happen," he said.

Pricing for Luminate for SAP R/3 starts at $50,000. It ships next month.

Candle's approach requires agents that monitor end-user activity at each client. The ETEWatch line of agents watch specific applications in order to report end-to-end response time. Tools in the ETEWatch line can track performance for an individual user or send reports to an administrator's console.

Big suites of systems management tools can provide valuable information about SAP R/3 and other applications, said David Passmore, president of network consultancy Decisys, Inc. in Sterling, Va., but they don't yet measure response times directly. □

Software helps rein in E-mail

CONTINUED FROM PAGE 51

E-mail to all those people."

As the volume of corporate E-mail continues to rise, some users seek software technology to help manage the crush.

Dan Barth, vice president and chief information officer at Pinnacle Brands, Inc., a trading-card maker in Dallas, said intranets could help stem the flow of at least some types of messages. Putting corporate news on an intranet would let people tap into the information they want without messages piling up. "It takes too much time to go through and delete them," he said.

Truly intelligent E-mail agents that could scan messages for content and decide what is important are probably far off. But some users said the ability of most corporate E-mail systems to combine rules and automate replies is helping them manage their mail.

"I just got back from vacation. I had 268 messages," said Eric Carpenter, a network systems engineer at Akin, Gump, Strauss, Hauer, Feld, a law firm in Dallas. His personal rules sorted the mail and trashed the daily announcements that appeared while he was out.

Mobile users who try to call in over bad telephone lines should institute rules so that large messages and attachments aren't automatically downloaded, Kotkosky said. "That can make or break your ability to communicate," she said.

If users want rules to forward or respond to messages when they are out of the office, an organization must have a mail package that can run rules on the server, said Mark Levitt, an analyst at International Data Corp. in Framingham, Mass.

A client-based rule wouldn't forward appropriate mail, for example, unless that client was logged in to the network. But users could still run rules that reside on their desktop systems to sort through the mail when they return.

For now, even after initial sorting and screening, there is still no substitute for plowing through the electronic pile that builds up after time out of the office. "There are no great, realistic solutions," said Mary Ellen Condon, director of management information and security at the U.S. Department of Justice. "If I had a clone, that would be one of the clone's responsibilities." ☐

Senior editor Barb Cole-Gomolski contributed to this report.

Novell users stick by vendor

CONTINUED FROM PAGE 51

mitted to NetWare won't jump ship over some bad financials and management shake-ups. And Novell has more to gain than lose by restructuring," said Josh Turiel, IS manager at Ad Life Marketing Corp. in Norwood, Mass.

"Reorganizations are always painful, and they're going to continue to have rough going for awhile. But I give Novell points for biting the bullet and making the necessary moves to get back on track," said Robert Ziedelis, assistant director of IS at Ad Life

But even users who are rooting for Novell to stay in the game as competition for Microsoft Corp.'s Windows NT Server expressed a feeling of inevitability about Microsoft's operating system.

"My feeling is that eventually we'll end up being a Windows NT shop, because we're being pushed in that direction by our third-party application software suppliers," said George Hoffman, technology services manager at Penobscot Bay Medical Center in Rockland, Maine. He said Midas Corp., which sells proprietary medical software applications, has told the hospital that future releases of its software will support only NT.

But the prospect of a Microsoft-takes-all world doesn't appeal to some users.

"I'm rooting for Novell to get its act together, but I'm worried it may not work out that way," Jayjock said. "I have a nagging fear that we're going to be assimilated by Microsoft, the monolithic giant." ☐

Briefs

IBM marketing tools

IBM announced a suite of marketing analysis applications that target telecommunications companies. DecisionEdge software, which was developed with BSG Corp. in Austin, Texas, will let telecommunications users manage marketing campaigns and analyze factors such as future product demand.

The suite will run on IBM's mainframe, AS/400 and RS/6000 systems and is scheduled for release in the fourth quarter. Prices will start at about $1 million.

PeerLogic gets patent

PeerLogic, Inc. in San Francisco has been awarded a patent for its Pipes messaging middleware, based on its capability to discover the best path between two applications in a heterogeneous network environment. PeerLogic competes in the middleware market with IBM's MQSeries and Tibco, Inc.'s Rendezvous.

Vitria middleware

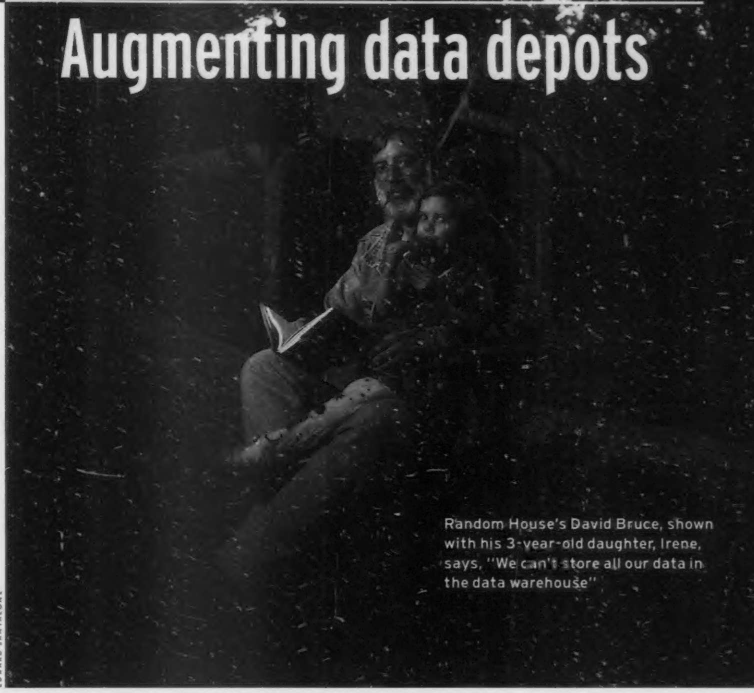
Vitria Technology, Inc. in Mountain View, Calif., announced middleware that lets companies avoid overnight batch processing delays when updating their suppliers, customers and internal departments in real time.

Called Velociti, the server software lets users subscribe to receive only certain types of data, which they receive via subject-oriented data channels. Prices start at $4,995 on Windows NT and Unix servers.

Videoconference ware

White Pine Software, Inc. in Nashua, N.H., announced what it called the first videoconferencing server software to provide standard connections over packet networks. MeetingPoint extends the interoperability of videoconferencing products because it will let users of Microsoft Corp.'s NetMeeting, Intel Corp.'s Internet Video Phone and White Pine's own CU-SeeMe teleconference together. Pricing starts at $1,995.

Augmenting data depots



Random House's David Bruce, shown with his 3-year-old daughter, Irene, says, "We can't store all our data in the data warehouse"

EDWARD SANTALONE

▸ Companies expand data warehouses to satisfy users' demand for access to raw data

By Craig Stedman

SOMETIMES A plain old data warehouse just isn't enough.

Many companies engaged in warehousing projects find that their end users want to analyze raw business data that didn't make it into the pools of historical information, which often are heavily summarized to boost query response times.

In addition, users aren't willing to wait for the data to be cleansed and loaded into the warehouse before they can fire away with analytical queries.

GIVE 'EM WHAT THEY WANT

Those twin demands are pushing some information systems departments to augment their data warehouses with repositories that store production data in all its detailed glory. The repositories can be used to satisfy cravings for access to raw data without opening up mainframes and other production systems to end users — steps most companies want to avoid because of concerns about security and overloading a production system [CW, Feb. 3].

For example, Random House, Inc. plans to use a separate repository as both a staging area to load its data warehouse and a long-term storage space for detailed data on book sales, returns and orders.

"We don't necessarily want to bring all that garbage into our data warehouse," said David Bruce, manager of database systems at the New York-based publisher. "That's not stuff people are interested in on a day-to-day basis, and it would make the warehouse too difficult to navigate."

But the raw data is needed at

Augmenting, page 60

RAD Java tools lure business users

By Sharon Gaudin

THE INCREASING availability of rapid application development (RAD) Java tools means that corporate developers will get applications out of the lab and into production anywhere from 10 to 100 times faster.

Users and analysts agree that the growth of RAD tools will increase the rate of Java adoption in the corporate arena, moving Java development out of the realm of software vendors and into the business world.

SPEEDING UP THE PROCESS

RAD tools, which aim to speed development time, move the development process away from basic code writing. They often offer drag-and-drop capabilities and have wizards and automatic code development so that when a developer writes a certain chunk of code, the tool will write the chunk that naturally comes after it.

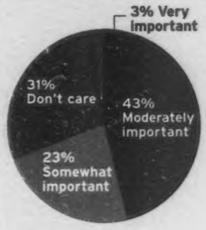
Influential application development tool vendors such as Symantec, Inc. and Borland International, Inc. have offered RAD Java tools, but more companies have joined the market in the past three or four months. This new wave of tools is part of Java's natural maturation as the language comes into its own.

For example, two vendors have made introductions in this area in the past few months. Seattle-based Asymetrix Corp. recently released two RAD editions of its Java development environment — SuperCede Java/ActiveX Edition and SuperCede Database Edition, which is specifically geared to database creation. And start-up Silver-

RAD tools, page 60

JAVA ADOPTION

How important is it for application development tools to support Java in IS departments?



Base: 73 corporate software developers

Source: The Standish Group International, Dennis, Mass.

HR POLICIES

Oracle unveils workflow application

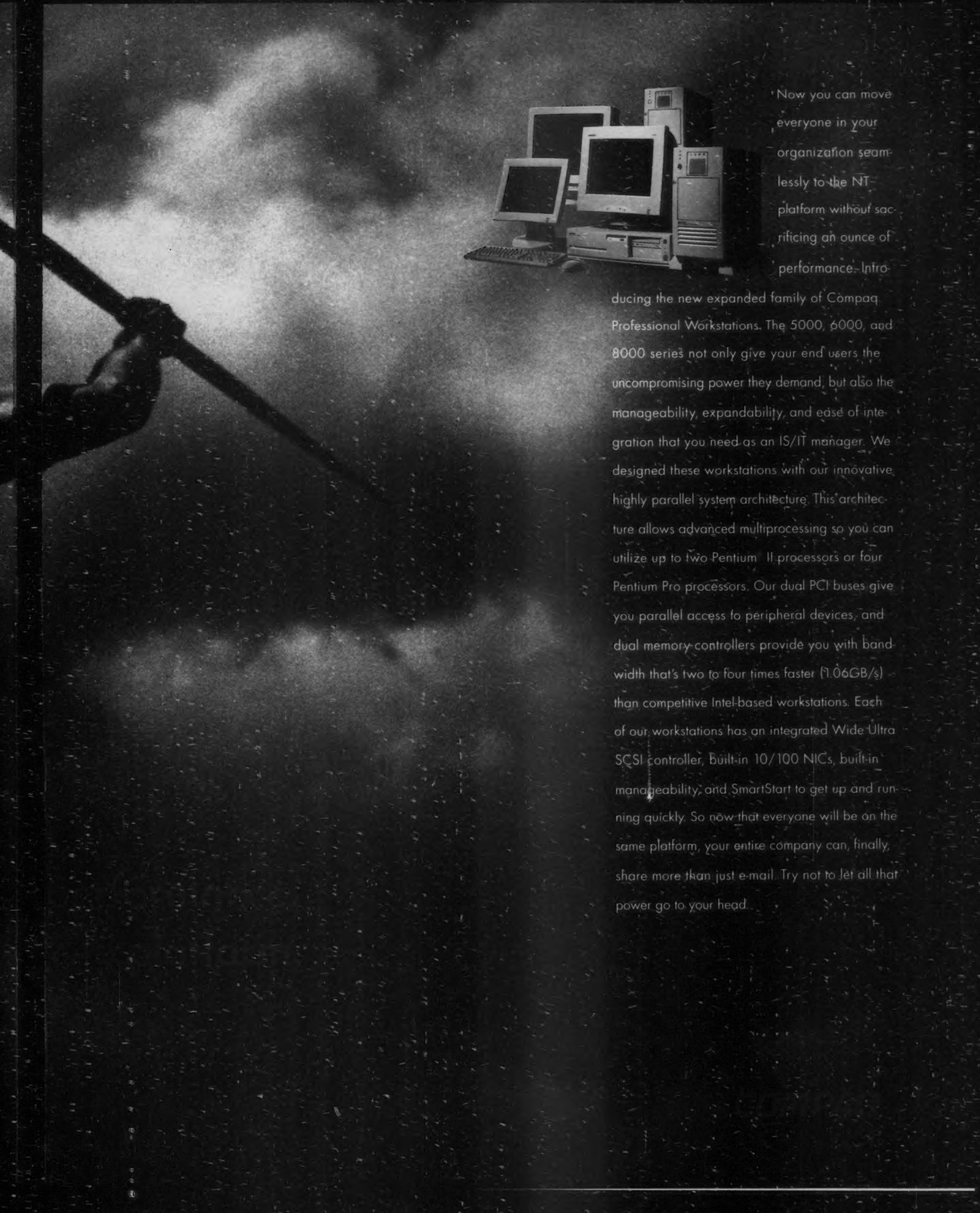
By Randy Weston

ORACLE CORP. is rolling out a human resources application module with a built-in workflow system that will let users include corporate policies in their software system.

Available now, the release is part of the Oracle Applications 10.7 software package. Among the enhancements to the application is an integrated business rules manager that triggers hierarchical approval mechanisms should certain changes be made

Oracle, page 60

the company
MMX
intel inside
pentium II



Now you can move everyone in your organization seamlessly to the NT platform without sacrificing an ounce of performance. Introducing the new expanded family of Compaq Professional Workstations. The 5000, 6000, and 8000 series not only give your end users the uncompromising power they demand, but also the manageability, expandability, and ease of integration that you need as an IS/IT manager. We designed these workstations with our innovative highly parallel system architecture. This architecture allows advanced multiprocessing so you can utilize up to two Pentium II processors or four Pentium Pro processors. Our dual PCI buses give you parallel access to peripheral devices, and dual memory controllers provide you with bandwidth that's two to four times faster (1.06GB/s) than competitive Intel-based workstations. Each of our workstations has an integrated Wide Ultra SCSI controller, built-in 10/100 NICs, built-in manageability, and SmartStart to get up and running quickly. So now that everyone will be on the same platform, your entire company can, finally, share more than just e-mail. Try not to let all that power go to your head.

Augmenting data depots

CONTINUED FROM PAGE 57

times for historical reporting and analysis, Bruce said. The warehouse proper will be limited to three years of summarized information, and data will be added and deleted each month. By contrast, the companion repository is seen more as a bottomless pool of data "where nothing ever changes," he said.

For now, the data warehouse and the raw data repository, expected to reach 150G bytes by year's end, will share a Unix server and potentially even be managed under a single Informix Software, Inc. database. But Random House may split them up "as we get more and more data down the road," Bruce said.

TAKING A SIMILAR ROUTE

Fidelity Investments in Boston is eyeballing a similar approach to solve a slightly different problem: Its risk-management employees want to have access to mutual fund trades more quickly than the twice-per-day feed the company's data warehouse allows now.

To meet those demands, Fidelity plans to implement a "trickle feed" that updates trades every 15 minutes, said Barry Rosen, principal data warehouse architect and consultant at the company. That would let the company "slam the data in there and let people ask real-time queries," he said.

Fidelity's trading data is warehoused in a decision-support database made by Red Brick Systems, Inc. in Sunnyvale, Calif. But Rosen said Fidelity is considering using an Oracle Corp. database to manage the more transaction-oriented trickle feed process. The information stored there would then get rolled up into the Red Brick warehouse for use in historical querying.

Such repositories are offshoots of operational data stores, which originated as a way to put recent account information in the hands of customer service workers.

An obvious potential roadblock facing the technology is cost, because it could require companies to add a significant amount of disk storage.

"But people are realizing that the real nuggets of information are in the detail data," said Wayne Eckerson, an analyst at Patricia Seybold Group in Boston. "If you're just looking at summaries, you could miss a lot of stuff." □

RAD tools lure business users

CONTINUED FROM PAGE 57

Stream Software, Inc. in Boston announced its own RAD Java tool — SilverStream — last week.

"I don't have time to muck around writing a bunch of code. That's really irritating," said Jeff Winchell, a software architect at Application Methods, Inc., a consulting and freelance development firm in Seattle. "If you're not using a RAD tool, you have to build up your own libraries. I could build my own, but that could take a year or three or five. Using a RAD tool is 10 to 100 times faster."

PRODUCTIVITY HIKE

Winchell, who uses Asymetrix's development environment, said he now does more than 10 times the Java development than before he began using a RAD tool.

Aside from SilverStream and Asymetrix, other RAD Java tool vendors include PowerSoft, Inc. with PowerJ, Borland with JBuilder, IBM with VisualAge for Java and Netscape Communications Corp. and Visigenics, Inc., which teamed up to offer Caffeine.

Evan Quinn, an analyst at International Data Corp. in Framingham, Mass., said the proliferation of RAD Java tools is critical for Java adoption. "There's a finite and small number of developers who are purist, object-oriented, code-warrior programmers. There's probably a factor of three times as many business-level developers who build with RAD tools instead. They hold the key to major Java adoption."

Karen Boucher, director of The Standish Group International, Inc. in Dennis, Mass., agreed. She added that RAD tools also are important in Java's ongoing battle with Microsoft Corp.'s ActiveX.

"ActiveX has a huge head start on development tools with Visual Basic, Visual C++, PowerBuilder and Delphi," Boucher said. "That means it's easier to start using ActiveX than Java. The more development tools that come out for Java, the more Java will get into the corporate development community." □

Oracle unveils HR application

CONTINUED FROM PAGE 57

to employees' personnel files.

For example, if an employee makes a comment on a review form, the change will be sent to the appropriate supervisors based on a preset hierarchy.

Judy Hodges, an analyst at International Data Corp. in Framingham, Mass., said that although most vendors' human resources applications have embedded workflow, the unique piece of Oracle's offering is the ability to follow a hierarchical structure based on a particular company's corporate structure.

Hodges said that even though Oracle traditionally hasn't been strong as a human resources application vendor, it is gaining significant market ground.

Oracle's product garnered $45 million in revenue for the Redwood Shores, Calif., company last year, a 114% increase from the previous year. Oracle holds 2.8% of the human resources application market, good for fifth place behind leaders SAP AG and PeopleSoft, Inc.

Yale University in New Haven, Conn., is investing $30 million to overhaul its human resources and financial systems using Oracle applications.

Chuck Paul, director of total compensation at the Ivy League school, said the integrated workflow was a much-needed feature to manage the complicated process to appoint faculty.

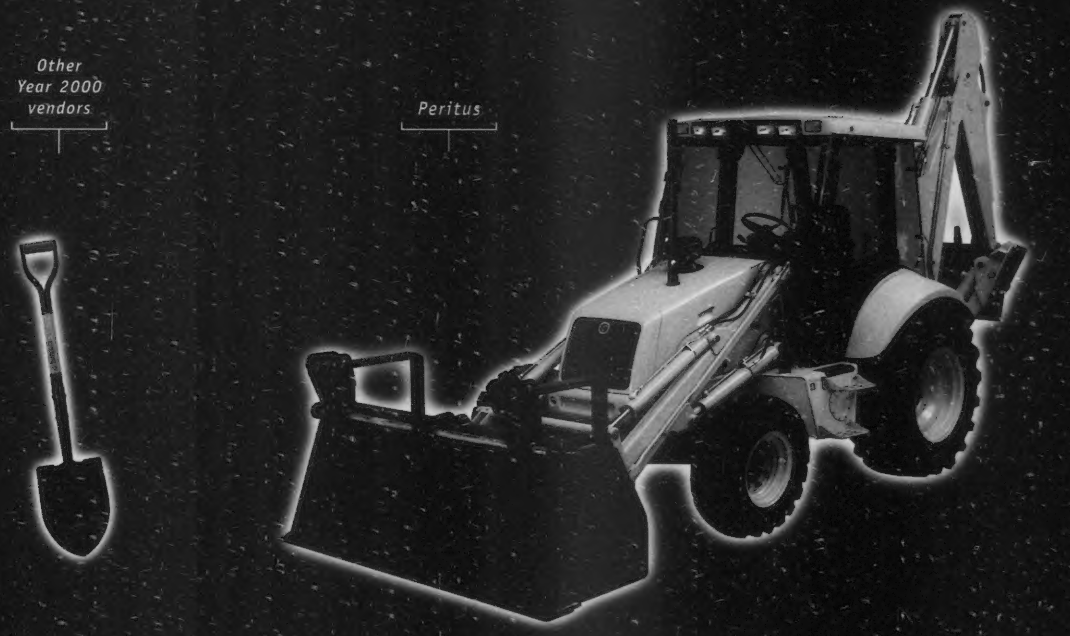
"Each school [within the university] has its own sets of rules, and different levels in a school have different rules so that an associate professor needs a different number of votes than a lecturer, for example," Paul said.

Paul said that process now is handled by paper, with paper votes flowing from one in-box to another in various offices.

"The biggest problem is that once the paper leaves the first office, you have no idea where it is," Paul explained. "With this new system, you can intelligently route the votes so they go to the next stop then the next stop. You can track it and see in the system where it is and what vote it is waiting for." □

Enhancements to Oracle's HR application Version 10.7

Enhancement	Function
Employee Direct Access	Lets employees change their personnel records
Workflow	Embedded business rules to manage applications
Person Forms	Includes configurations for work locations, medical review data, security checks, multiple phone numbers and student information
TaskFlow	Allows for history of applicants and jobholders of a position


Other
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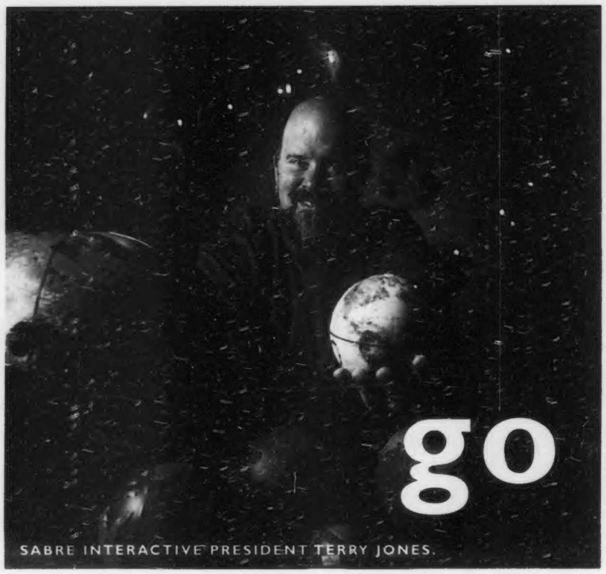

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Briefs

Secure tape on tap

Storage Dimensions in Milpitas, Calif., is shipping a digital linear tape backup system with RAID fault tolerance usually found in disk systems. The Jetarray DLT7000 has 210G bytes of RAID 5 (highest security) capacity and was designed to back up high-performance superservers. The Jetarray costs $51,000.

Sun heats up storage

Sun Microsystems, Inc. last week beefed up its storage software offerings by shipping several tools for its Solaris servers. The Mountain View, Calif., company licensed technology from Veritas Software for its Enterprise NetBackup and hierarchical storage management products.

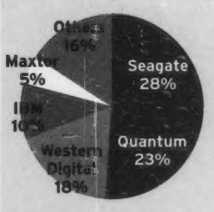
Sun also has rewritten Veritas' Volume Disk Manager for Solaris and is using Veritas' File System for overall data management.

DG switches servers

Data General Corp. has switched from Motorola, Inc. processors to Intel Corp. Pentium chips to power its second generation of Aviion servers.

The servers can support up to 32 200-MHz Pentium Pro processors in one large, multiprocessing system. The chips let the servers run on both Windows NT and Unix platforms. Pricing for four-processor systems starts at $70,000. The 32-processor AV 2000 costs $690,000.

1996 hard disk drive shipments



Total units: 106 million

Source: TrendFocus, Inc., Palo Alto, Calif.

Iron mix nabs debtors better

▸ *Unisys NT/mainframe box helps bill collector*

By Tim Ouellette

THE BILL COLLECTOR won't be fooled this time.

With a combination of big iron processing and easy-to-use Windows NT applications, Wolpoff & Abramson, a collection agency in Bethesda, Md., can now move a nonpayment complaint from initial contact to a full lawsuit in two days.

And the access to better information lets employees, who process 60,000 new delinquent accounts every month, catch debtors in lies they may have used a number of times before.

The agency did this by installing Unisys Corp.'s ClearPath HMP NX4800, a mainframe system partitioned to include Intel Corp. Pentium processors running Windows NT in the same box.

"Now we can tie the two worlds together," said Don Miller, Wolpoff's chief information officer. "The mainframe will start to look more like a PC for our users."

ClearPath HMP's mixed environment (dubbed heterogeneous multiprocessing) lets Windows NT applications move data quickly to and from the mainframe for quick processing and analysis, instead of waiting for overnight batch jobs. ClearPath has given Unisys' 8,500 large mainframe sites a chance to easily upgrade their aging A Series or 2200 machines, analysts said. And users can modernize the systems, which aren't compatible with IBM's popular S/390 mainframes, by working with newer Windows NT applications.

"Windows NT Server is our basis for intranet and office applications," said Robert Helwig, a technical support analyst at the agency. "We had a lot of sup-

Mainframe, page 67

Unisys' ClearPath HMP includes:

- CMOS mainframe processor
- Intel processor in separate partition
- Master Control Program/Advanced Server operating system
- Windows NT Server

NetPCs to launch at PC Expo

By April Jacobs

FROM SERVERS TO NETPCS, a plethora of vendors will show off their new hardware at PC Expo in New York this week.

Intel Corp. in Santa Clara, Calif., plans to host an event today to show hardware that meets the specification for Microsoft Corp. and Intel's jointly developed NetPC. The NetPC is a stripped-down PC that is sealed or locked to keep users from changing it and to reduce maintenance. Dell Computer Corp. in Round Rock, Texas, will be among the vendors to demonstrate the machines.

Unisys Corp. also will preview servers, desktops and laptops at the show. It will demonstrate a 10-way Windows NT system from its Aquanta line.

Packard Bell-NEC will show additions to its Express5800 line of servers, which range from small-business to midrange computers.

NEC in Sacramento, Calif., said it will announce the MH4000, a four-way server that scales to four 200-MHz Pentium Pro chips, with prices starting at less than $10,000.

NetPCs, page 67

REVIEW▸ *Digital's 433A workstations and FX32 emulation software*

Alpha apps thrill, but others stall

By Howard Millman

SPEED! Digital Equipment Corp.'s 433A workstations will have users reaching for their seat belts and aviator's goggles when running native applications under the Alpha-optimized version of Windows NT.

My test machine, the Digital Personal Workstation 433A for Windows NT, targets technical users who demand extensive graphics processing and floating-point capabilities for computationally intensive tasks such as computer-aided design, geographic information systems and scientific prototyping.

Available with 433-MHz, 500-MHz (and soon 600-MHz) CPUs, the three versions offer an attractive price/performance ratio and stand out as robust contenders in affordable 32/64-bit workstations. For their money, 433A system purchasers receive blazing performance; Digital estimates the 433A can at least double the overall performance of Intel Corp. Pentium Pro-based workstations.

But remember, to achieve those tire-burning speeds with the Alpha, you need native applications. Alpha-optimized applications are plenti-

Speedy, page 69

PRODUCT REVIEW▸

Digital's Personal Workstation 433A

OVERALL B- GRADE

Price: $4,750 to $13,000, depending on monitor size and other features

Laptops, notebooks get even thinner

▸ *Toshiba sparks shift to lighter, smaller portables*

By Mindy Blodgett

TOSHIBA AMERICA'S recent launches of ultraportable laptops and "mini-subnotebooks" that weigh less than 2 pounds were just the beginning of a growing trend, industry observers said.

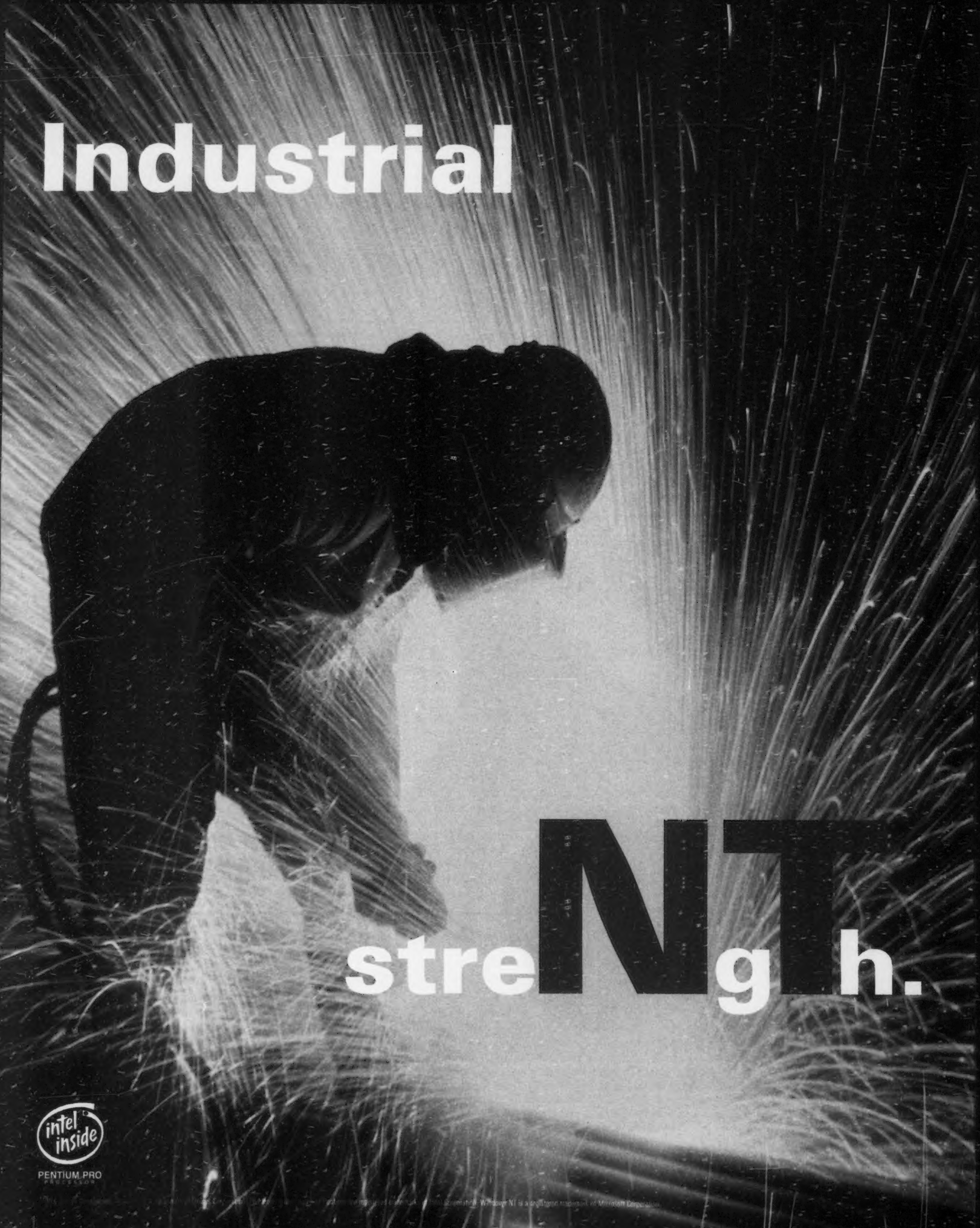
"It looks as if there may be a dramatic shift to lighter, smaller notebooks in the coming year in the industry," said Ken Dulaney, an analyst at Gartner Group, Inc. in San Jose, Calif.

In addition to the laptops from Toshiba America Information Systems, Inc. in Irvine, Calif., announced June 2, Packard Bell-NEC in Mountain View, Calif., is expected to release some ultraportables in the next

Laptops, page 67

Toshiba Libretto 50CT

Processor:	75-MHz Pentium
Weight:	1.85 lb.
Screen:	6.1-in. color
Audio:	Built-in
Price:	$1,999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n theory, moving to Windows NT means using PC servers to handle the demands of heavy-duty computing.

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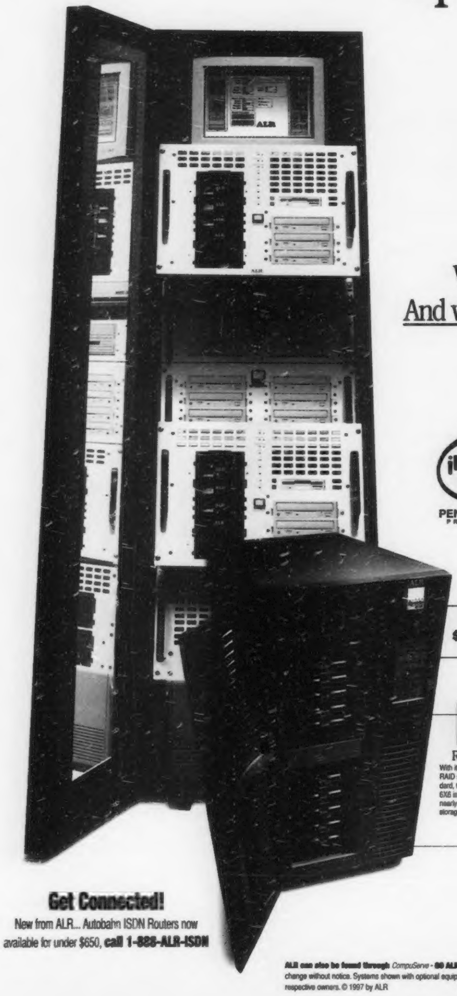

...for any IS department that wants a high degree of fault tolerance and scalability without paying top dollar for it. And what IS department wouldn't?"

InfoWorld April 14, 1997

Manufacturer/Model	ALR® Revolution 6X6™	Compaq® Proliant™ 5000
CPU	Pentium® Pro 200/512	Pentium® Pro 200/512
Maximum SMP	**6 CPU**	4 CPU
Memory	128-MB	128-MB
Hard Disk Drive Storage	9-Gigabytes	9-Gigabytes
LCD Touchscreen Diagnostics	**Standard**	Not Available
CD ROM	**16X**	8X
RAID Ready	**6 Bays**	4 Bays
Hot Swappable Expansion	**6 Bays**	None
Expansion Slots	**12 Expansion Slots**	7 Expansion Slots
Network Interface	10/100 Ethernet	10/100 Ethernet
On-board Disk Controller	Fast/Wide Ultra SCSI	SCSI-2
Server management	ALR InforManager™ with ActiveCPR™	Compaq Insight Manager™
Power Supply	**700 Watts** (1050 opt.)	488 Watts
Redundant Hot-pluggable N+1	**Standard**	Redundant only
On-site Service	3 Years On-site Service	3 Years On-site Service
Factory Warranty	**5 Year/36 Month**	3 Year
Price	**$13,675**[1]	$14,915[1]

[1] Pricing based on IDC estimated street pricing. Verify pricing, configuration and specifications with product manufacturer.

intel inside

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Mainframe mix aids bill collector

CONTINUED FROM PAGE 63

port applications that did not need to be on the mainframe, but it did not make sense to replace the mainframe with a Unix server either."

For example, to keep updated telephone listings to track deadbeat consumers, Helwig used to copy the monthly CD-ROMs to tape, then load the data into the mainframe over the weekend.

A CD-ROM tower managed by Windows NT can now hold the CD-ROMs and give the mainframe only the data it needs, while letting users access the information more quickly.

Although officials at the longtime Unisys shop considered moving operations to a large Unix-based client/server system, they decided big iron reliability was still a must.

"We can't talk to anyone without our database system, and that just can't afford to go down," Miller said. "That's where the mainframe plays."

Unisys, based in Blue Bell, Pa., isn't the first vendor of mainframe or midrange systems to try integrating Windows NT.

IBM's AS/400 has its own Intel-based PC board that will eventually run Windows NT applications [CW, March 3].

And IBM's mainframe operating system, OS/390, can now support Windows NT applications through a third-party interface, not onboard the machine. □

Laptops get even thinner

CONTINUED FROM PAGE 63

few months. And other vendors are expected to follow.

What Toshiba calls a mini-subnotebook is smaller than the average laptop but larger than a handheld device such as a personal digital assistant (PDA). An ultraportable is simply a lighter, thinner, full-size notebook.

> "It remains to be seen, but there is a performance trade-off with these lighter notebooks."
>
> – Randal Giusto, International Data Corp.

Users said lighter and smaller notebooks are welcome as long as they are available in sufficient quantities and deliver good performance at low prices.

"Anything lighter and thinner is welcome and would be desirable to my users," said George Staton, information systems director at Commerce Bank in Cherry Hill, N.J. "But looking into the future, I have to buy what is available when I need it. I have many users who would appreciate a lighter laptop when they're on the road — I would myself. But sometimes, the supplies just aren't there after they make these big announcements."

But not all industry observers expect the lighter notebooks to take off in the marketplace.

"I think there is a niche market only for laptops like the Librettos from Toshiba," said Randal Giusto, an analyst at International Data Corp. (IDC) in Framingham, Mass. "It remains to be seen, but there is a performance trade-off with these lighter notebooks, and there is a limited market for them."

Recently, Toshiba announced the following laptops:

- Billed as the industry's first notebook with the Windows 95 operating system to weigh less than 2 pounds, the Libretto 50CT is what Toshiba officials call a mini-subnotebook. The small notebook has a 75-MHz Pentium processor, a color screen and a 772M-byte hard drive. It will sell for $1,999.
- The Portege 300, an ultraportable that weighs in at 3.8 pounds, will have a 133-MHz MMX Pentium processor with an active-matrix color screen and an integrated 33.6K bit/sec. voice/data/fax modem. It will cost $3,499. □

NetPCs to debut at PC Expo

CONTINUED FROM PAGE 63

The MH4000 features 512K bytes of L2 cache, hot-pluggable disk drives, six Peripheral Component Interconnect and four Extended Industry Standard Architecture slots and 54G bytes of disk storage.

And IBM will discuss additions to its System Care hardware, service and support program, which it launched last November.

The company will add service bundlings through business partners. System Care lets users lease equipment and purchase service and support through IBM and its business partners for a monthly fee, which includes start-up planning and integration. □

SHORT

Faster Alpha workstation

Deskstation Technology, Inc. last week upgraded its workstation lineup with a system based on the 600-MHz Alpha chip. The company is among a handful of vendors manufacturing systems based on the Digital Equipment Corp. chip. The Ruffian RPX Windows NT workstation, which is aimed at the mechanical computer-aided design, animation and World Wide Web application markets, supports 64M bytes of RAM, 2M-byte cache, 4G-byte ultrawide SCSI drives, 12-speed CD-ROM and three-dimensional graphics. Pricing starts at $5,995.

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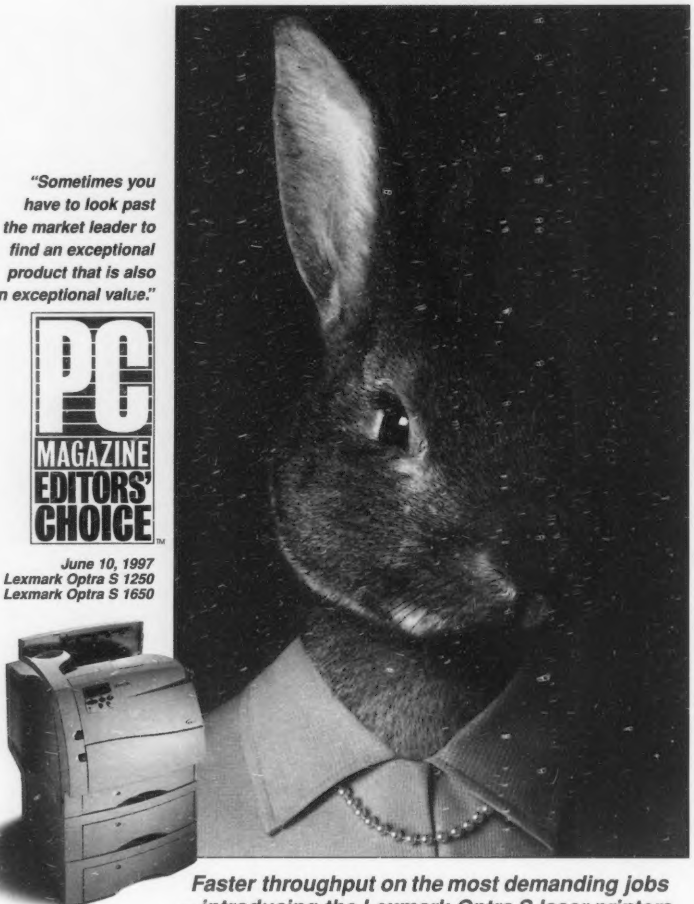

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REVIEW▸ *Digital's 433A workstations and FX32 emulation software*

Speedy Alpha works well with native apps

CONTINUED FROM PAGE 63

ful for technical, scientific and entertainment projects, but they are a rare commodity in the world of office productivity.

FX32: NOT PRIME TIME YET

Digital bundles in its FX32 emulation/translation software, which it says allows the Alpha-based boxes to mimic Intel Pentiums. However, my tests indicate that FX32 isn't quite ready for prime time.

The test unit employed a 433-MHz Alpha 21164 processor with a 2M-byte external cache and 128M bytes of RAM, which can grow to 1.5G bytes. Internal storage included two 2.1G-byte ultrawide (and ultrafast) SCSI drives controlled by an Adaptec controller. Microsoft Corp.'s Alpha-specific version of NT comes preloaded. Connecting Digital's 10/100-Base-TX Fast Ethernet network interface card to my NT network went smoothly.

The 433A deftly fills the gap between Pentium Pro-based workstations that run Windows NT and low-end Unix workstations, providing you run native Alpha applications. As Digital continues to increase the speed of its Alpha chips and reduce FX32's incompatibilities, it is likely just a matter of time until the two products equal or surpass the performance of Intel's fastest Pentium chips.

Despite the impressive performance of Digital's 433A workstation for native RISC applications under Windows NT, most of the world's office productivity software runs on Intel CPUs.

Understandably, users want to buy and maintain one computer to run both their technical applications and general computing software. Digital said its FX32 translation software provides the best of both worlds. Unfortunately, in my tests, FX32 suffered from compatibility, configuration and performance woes.

The first time you run an Intel/X86 application, FX32 acts like an emulator, imitating X86 code and calls. Each subsequent time you run the application, FX32 continues to learn more about how the application operates. Working in the background, it creates an Alpha-optimized version of the X86 application's code. Theoretically, after you run the X86 application a few times, you should achieve about the same level of performance the software will provide when running on a Pentium Pro. My experiences differed. When running Microsoft Office 97 for Windows 95 and Corel Corp.'s Office for NT under FX32, their overall performance equated to what I would expect from a 100-MHz Pentium.

PRODUCT REVIEW▸

FX32

(Alpha RISC/CPU to Intel/CISC code emulator and translator)

OVERALL GRADE C

DIGITAL EQUIPMENT CORP.
Maynard, Mass.
www.digital.com

Comes bundled with Alpha/Windows NT workstations

In spite of Digital's promise that Version 1.0 of FX32, which shipped with the machine, will run 32-bit Windows applications smoothly, I initially experienced a variety of problems loading and running Microsoft's and Corel's suites. The system generated random lockups, delays and overall bizarre behavior. Adobe Systems, Inc.'s PageMaker 6.0 even generated a kiss-of-doom message: "This software requires an Intel processor."

After several conversations with the company's helpful-when-you-can-reach-them technicians (each session required two or three telephone calls), I downloaded Version 1.1 of FX32 from Digital's World Wide Web site (*www.digital.com*). This solved the lockup and strange behavior problems with my two test applications, but the performance remained lukewarm.

I recommend caution when running Intel applications until Digital releases Version 1.3 of FX32 (now in beta) and the 600-MHz Alpha CPU. According to a Digital spokesman, the newer version of FX32 will offer improved performance and increased compatibility. When combined with the forthcoming 600-MHz Alpha CPU, the duo could prove awesome. Time will tell. ☐

Millman operates the Data Systems Services Group, an independent networking and problem-solving consultancy in Croton, N.Y. He can be reached at hmillman@mcimail.com.

NEW PRODUCTS

APS TECHNOLOGIES has announced APS ShortStack RAID, a storage and backup subsystem.

According to the Kansas City, Mo., company, the APS ShortStack RAID offers fast I/O times. It is compatible with Power Macintosh 8500 and 9500 computers and employs MetaTools, Inc.'s PowerTools controller software. Three types of arrays with four different drive configurations are available.

Pricing starts at $1,899.

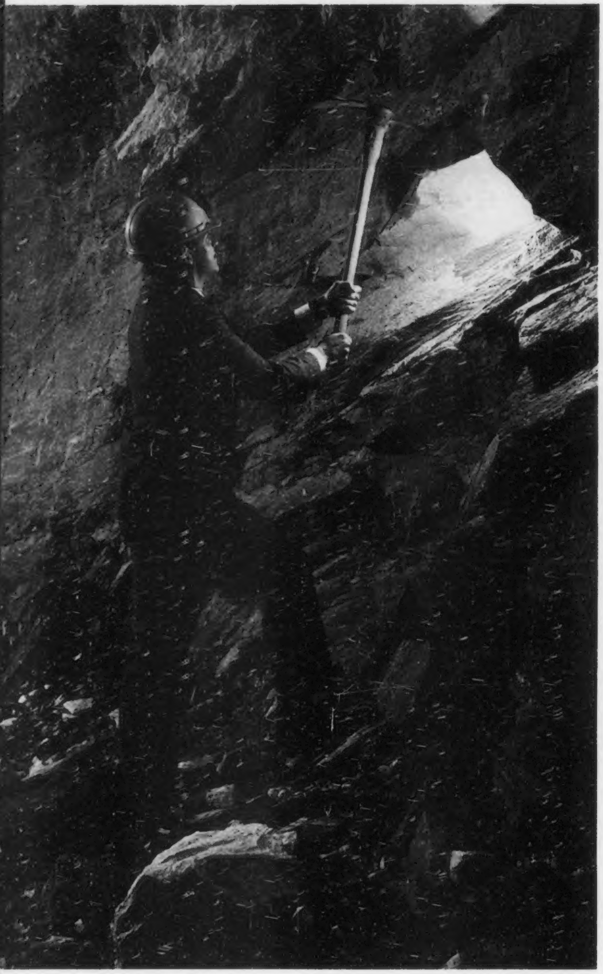
APS Technologies
(816) 483-2600
www.apstech.com

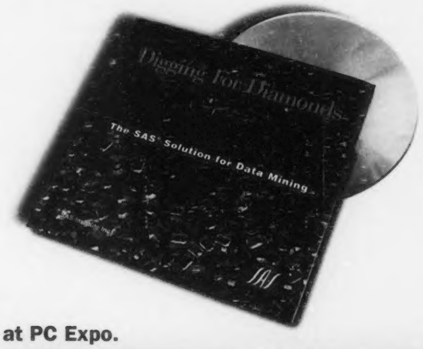
AM GROUP CORP. has announced its Universal Voltage Source (UVS), a device that eliminates plug-in-the-wall transformers.

According to the Irvine, Calif., company, the UVS contains three external power sources for lower voltages and currents that can be selected by switches. Two port expanders are available, which means that up to six peripheral devices can be connected to one power source.

Pricing starts at $59.95.

AM Group
(714) 261-9971




Digging For Diamonds
The SAS® Solution for Data Mining
SAS

Data Warehousing

Special Bonus Technical Section

Briefs

Carleton package

Carleton Corp. in Billerica, Mass., has announced a deal to expand its MetaCenter data warehousing package to include data-quality analysis software developed by Cambridge, Mass.-based QDB Solutions.

MetaCenter, which was introduced this spring, bundles Carleton's Passport data extraction tools with warehouse management and load-scheduling software from two other vendors. Carleton is integrating all the tools via a common meta data repository and then reselling the external products.

Single-user too!

Dimensional Insight, Inc., a small decision-support vendor in Burlington, Mass., recently introduced a version of its single-user multidimensional analysis software with a redesigned user interface and built-in support for the Open Database Connectivity specification. The DI-Diver software runs on Windows NT and Windows 95 and costs $1,000 per user.

The company also plans this month to ship a client/server combination, called DI-Atlantis, that supports centralized analysis and reporting.

And the winners are ...

The Data Warehousing Institute in Bethesda, Md., last week announced the winners of its 1997 Awards for Best Practices In Data Warehousing. The winners are: Owens & Minor, Inc. in the Data Extraction, Cleansing & Transformation category; AT&T Corp. for The Warehouse & the Web; Fidelity Investments for Very Large Data Warehouses; Eckerd Corp. for Management & Organizational Issues; Federal Express Corp. for Data Warehouse Applications; and Concert Communications Services for Data Warehouse in Telecommunications. A synopsis of each presentation is available via electronic mail at melinda@springbok.com.

Turning to outside warehousing help

▸ *Maintaining project control is important*

By Craig Stedman

A LACK OF internal data warehousing skills continues to force companies to turn to outside consultants for help. But for many IS departments, consultants are becoming more of a shot in the arm than a warehousing cure-all.

The nature of data warehouses makes it hard to simply call in consultants or systems integrators and then sit back while they develop an implementation for you, according to information systems managers who have slogged through the warehousing process.

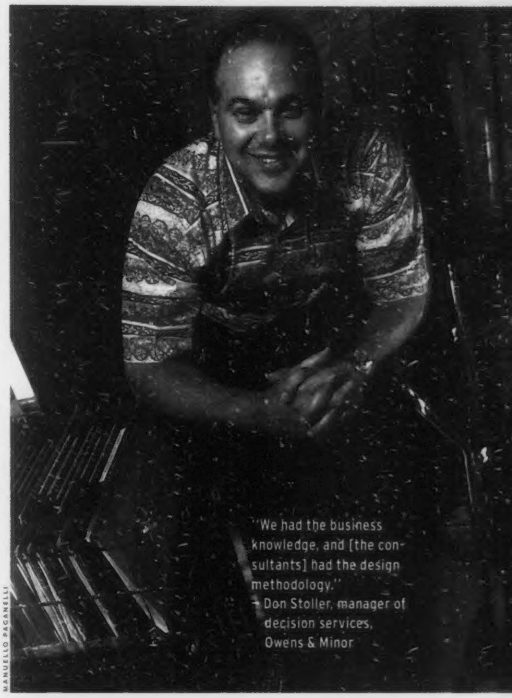
For one thing, a consultant probably won't have the intimate business knowledge that is viewed as key to building a successful data warehouse. And putting everything in the hands of high-priced outsiders could leave you dependent on them for the ongoing alterations that inevitably have to be made as business needs change.

As a result, several warehousing managers said they are signing on consultants or integrators to jump-start projects rather than have them do all the driving for them.

"It reminds me of an old saying: 'Give me a fish, and I can eat today. But if you teach me how to fish, I can basically eat for a lifetime,'" said Frank Brooks, manager of data resource management at Blue Cross/Blue Shield of Tennessee, a Chattanooga-based health insurer.

Blue Cross/Blue Shield last

Outside help, page 72



"We had the business knowledge, and [the consultants] had the design methodology."
– Don Stoller, manager of decision services, Owens & Minor

MANUELLO PAGANELLI

COMMENTARY

Plan for data marts

SHAKU ATRE

IT'S OFTEN sobering to see the difference between what data warehousing experts advise and what users actually do.

Quite rightly, the experts tell us that one key to boosting data warehouse query performance is liberal use of meta data, indexes and summary tables. Those measures improve response time by doing much work in advance to digest and organize data for fast retrieval and analysis. In many warehouses, it is necessary to set up one or more summary tables to support each new query or type of query. Such auxiliary data can easily reach three to seven times the volume of the source data.

In contrast to this picture, a user survey conducted recently by Atre Associates found that most of the respondents don't make much use of summary tables or meta data in their new data marts. Instead, those data marts are loaded mostly with detail data. Less than 15% of our respondents plan, at least in the next year, to use an amount of summary data equal to the volume of detail data. Most reported much less summary data.

What does this indicate? Many of the data marts handle simple queries — some canned and some ad hoc — 50% to 80% of the time. Although the response times are less than two

Atre, page 72

Users not convinced of bundled data mart value

▸ *It's low cost, easy integration vs. customization*

By Sharon Gaudin

BUNDLES MAY BE one of the hottest trends in the data mart industry right now, but are the ease of integration and lower price tag enough to convince users that they don't need a customized solution?

The idea of bundling data mart building products, such as databases, with query tools and applications hit the market about a year ago. Since then, most of the major companies, such as Oracle Corp. and Sybase, Inc., have jumped onboard with their own bundles. The bundles were designed to save users time and headaches involved with integrating various products, while offering as much as a 20% discount.

Although vendors are waving the flag for a hot, new trend, actual sales may be slow to catch up to the hype.

Dunsgate's Dave Lingren:
"We're still in the do-it-ourselves mode. We haven't picked up on the bundling."

And industry observers say if the trend is slow to catch on for data marts, the chances of its crossing the line to the heavyweight data warehouse market

Users, page 72

Outside help

CONTINUED FROM PAGE 71

year brought in separate consultants to help build data extraction routines and desktop query applications when it developed a mainframe-based data warehouse. But in most cases, the consultants "didn't even get on the keyboard," Brooks said.

The insurer mostly used the consultants to get IS staffers up to speed on the warehousing tools it chose. Brooks needed six people to meet his deadline for building the extraction programs that feed the warehouse, and the cost of doing that with $1,500-per-day consultants "would have been astronomical," he said. "And then they would have left with all the knowledge."

WAREHOUSING CONSULTANTS

Thrift Drug, Inc. in Pittsburgh learned its lesson the hard way several years ago. At first, the drugstore chain signed up Sequent Computer Systems, Inc.'s consulting unit to develop a data warehouse with minimal participation by Thrift employees.

But the consultants didn't fully understand Thrift's business processes, which led to a warehouse loading nightmare when some store sales data unexpectedly showed up a day or two late. All the daily sales summaries had to be updated, a step that stretched the loading process beyond the allotted window.

"Our lack of involvement caused some of the problems," said Beth Mollica, information warehouse project manager at Thrift, which was merged into Clearwater, Fla.-based Eckerd Corp. last year.

After the problems came to light, Mollica and other Thrift IS employees started working with Sequent consultants "as a team, basically attaching ourselves to their hips," she said. "We became accountable."

Turnkey projects still aren't unheard of. But as more data warehouses get deployed, companies are finding that perpetual tinkering is needed to keep query speeds from bogging down. That is pushing more IS managers to get involved with consultants up-front in "the dirty work of database design," said Alan Paller, director of research and education at The Data Warehousing Institute in Gaithersburg, Md.

For example, Owens & Minor, Inc. in Glen Allen, Va., put IS staffers and consultants together in one-on-one development teams for an Oracle Corp.-based warehouse that went live this spring using Informatica Corp.'s data extraction software and Business Objects SA's query tools.

"We had the business knowledge, and they had the design methodology," said Don Stoller, manager of decision services at Owens & Minor, a distributor of medical and surgical supplies. Without the teaming, "we wouldn't have been able to gain the skills to do this on our own going forward," he said.

EXPERTISE WORTH COST

MCI Communications Corp. uses consultants heavily on data warehouses and other IS projects. Outside developers and database administrators with warehousing skills can speed up projects enough to make their daily fees of $400 to $1,200 per day palatable, said Chip Grim, director of sales systems development at MCI's Denver facility.

But the consultants typically augment and train MCI staffers, and most aren't left to their own code-writing devices. "Unless consultants really know your data, whatever they build for you is probably going to be wrong out of the gate," Grim said. "It usually has to go through several revisions to get it right." □

Users not convinced

CONTINUED FROM PAGE 71

are slim, at least in the near future. But some users said they wish vendors would bundle data warehouse products with extraction tools to make the buying and integration processes easier. Data mart bundle users were hard to find.

"We're still in the do-it-ourselves mode," said Dave Lingren at Dunsgate, the New York-based information technology division of Wall Street powerhouse The Dun & Bradstreet Corp. "We haven't picked up on the bundling. We buy the products specific to our projects, and we put them together ourselves.

"We don't see the value in convenience," Lingren added. "We're more likely to buy a selection of products rather than a bundle because it gives us control. That's what we do. That's our value-added to the project."

> **"I'm constantly fighting the battle of finding the right tool at the right cost and hoping it works with the other tools I've bought."**
>
> **– Mark DeNarie,**
> **Pacific Gas & Electric**

CUSTOMIZATION PREFERRED

Lingren is like many information systems managers who would rather customize their data mart than save time — and usually money — by buying a more generic package.

A data mart generally is a small-scale, task-specific version of a data warehouse. A retail company, for example, would build a data mart to track outdoor-clothing sales. That same company's data warehouse would hold information on everything from clothing sales to inventory, shipments and the sale of all other products.

Neal Mendelson, senior director of data warehousing at Oracle, said the bundles are for users who want to get the system up and running quickly. "IT departments are shrinking more and more, so they need something easy to install, easy to get up and running," Mendelson said. "They need a solution that non-IT people — marketing, sales, CEOs — can use."

Pam Whitmore, director of data warehousing solutions at Sybase, said the company's QuickStart DataMart bundle was designed for ease of use. "These products have all been tested to make sure they work well together," she said. "The customer doesn't have to choose and then worry if they'll integrate well. They save money on that cost of trial and error."

Whitmore wouldn't give sales figures on the QuickStart DataMart, but she did say sales have been slow to get started.

Mendelson, who declined to give sales numbers, added that what makes data mart bundles attractive also keeps them from being an attractive option in the data warehousing market. "Data warehouses drive the business," he said. "These projects are very complex, longer term and don't lend themselves as easily to packaging. It's a process more than a product."

Richard Rist, vice president of The Data Warehousing Institute, a Gaithersburg, Md.-based association of corporate warehousing integrators and operators, said another factor that keeps bundles out of the warehousing market is the higher cost, compared with data marts. The price of a data warehouse can reach seven figures, whereas the cost of a data mart is generally in the low range of five figures.

CUSTOMIZATION EXPECTED

"When a company is paying that kind of money for a data warehouse, they're going to want a customized solution," Rist said. "They're not going to be interested in saying, 'Well, that package is close enough.'"

Yet Mark DeNarie, energy management systems operations supervisor at Pacific Gas & Electric Co. in San Francisco, said if there was a little more bundling going on, his costs might be lower.

"I'd like to see that, definitely," said DeNarie, who uses Oracle products for his data warehouse. "They're dangling that cost carrot. They don't want to give you something at 25% of what they're getting now. There's no impetus out there to do that." There was more incentive for vendors to jump onboard with data mart bundles because the price tag for marts is lower and the tools needed are fewer, observers said.

DeNarie also said a bundle of data warehousing products, along with querying tools and applications, would save him a lot of the time he spends configuring and integrating his system. "There's got to be easier ways to configure," he said. "There are so many separate products in there. I'm constantly fighting the battle of finding the right tool at the right cost and hoping it works with the other tools I've bought." □

Atre: Plan

CONTINUED FROM PAGE 71

minutes for a large share of the queries, several managers reported a high proportion of simple queries with long response times, often more than 20 minutes. For complex queries, that wouldn't be good; for simple queries, it's abysmal, especially with the robust hardware that many respondents employ. To bring more query response times below two minutes, several managers plan to add summary data and increase the percentage of canned queries.

FAST GROWTH EXPECTED

The survey shows that many of these data marts were built quickly, in three or four months. Most managers project rapid growth, at 100% or more yearly, over the next two to three years.

If you read between the lines, it looks as if many organizations have found the same shortcut: Get a data mart in place as fast as possible, then address performance issues and build queries later. To me, that suggests that users built the data mart before they knew what they were going to do with it and what queries were needed. That, in turn, suggests either that planning didn't receive enough attention or that IT was uncertain as to how to gather requirements for data mart queries.

I would guess that, for many of these organizations, a pilot project with generic functionality became, without much additional function, the production system.

That situation underscores how difficult it can be to design a data mart, given that end users often don't know their query needs until they work with a data mart live. What's the solution? Generally, you need to make an extra effort to pin down amorphous requirements by seeking more user feedback through planning, prototyping and piloting. That gives you material for a design that goes beyond the generic. Data mart design should be business-driven.

Organizations often keep their first data mart small to limit the technical challenges. That makes it feasible to build quickly. But if you aren't careful, the simplification of the technical challenges can lead you to skimp on planning. You need to find out what the end users want the data mart to do and deliver as many of those capabilities as you can, with good performance, before the system is put into production. □

Atre is president of Atre Associates, Inc., a consulting firm in Port Chester, N.Y., that specializes in data warehousing and database technology. She can be reached at (914) 939-0045 or by E-mail at shaku@atre.com.

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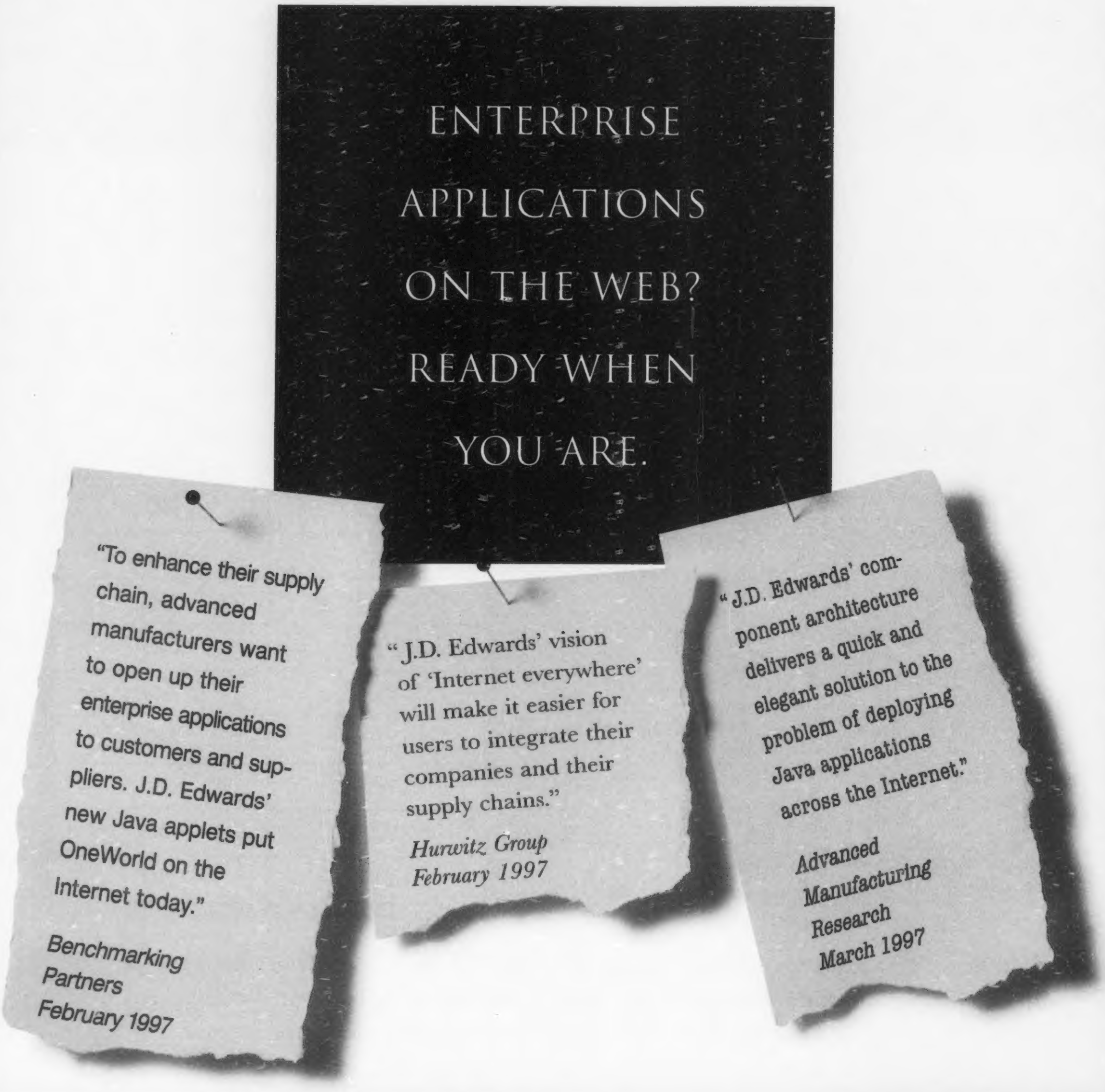

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SOFTWARE FOR
A CHANGING WORLD

Year 2000 advice: Punt!
Don't try to solve your millennium problem. Accept defeat and install a new infrastructure, Peter G. W. Keen writes. Page 84

When the going gets tough and stressful, it helps to loosen up the IS shop

AARP's Jeanne Simia (with colleaques Joe Cuevas, center, and Peter Slivka): "Laughter can be the best medicine for what ails you day to day"

CHRIS HARTLOVE

FRAZZLED? LET'S PARTY!

By Kathleen Melymuka

In the IS department at the Washington headquarters of the American Association of Retired Persons (AARP), everyone's been working too hard.

Nerves are frayed. People are getting testy. Tempers flare. Suddenly, a guy jumps up and shoots his co-worker — with a Super Soaker water gun. His colleague pulls out her plastic piece and returns fire. The rest of the staff joins in. The tension evaporates into gales of laughter and indoor precipitation.

"Stress and burnout are no small issues in the IS workplace," says Jeanne Simia, AARP's director of information systems/customer service (and buyer of the first water gun brought to the office). "Laughter can be the best medicine for what ails you day to day. There are a myriad of things you can do to inject a bit more fun into your workplace."

Fun may be more important than it's given credit for. "Quality of work life is much more important than money," says Ann Vincola, national director of work life consulting at Coopers & Lybrand in Boston. "Studies at Du Pont, Merck, Johnson & Johnson and Xerox have definitely told us that people who have a better quality of work life do a better

Frazzled? page 77

FRAZZLED

LET'S PARTY!

CONTINUED FROM PAGE 75

job, are more committed and stay longer."

Statistics from *Computerworld*'s 1997 Job Satisfaction Survey [CW, May 26] indicate that IS staffers can use a little fun. A large majority of the 503 IS managers and professionals surveyed described workdays as "very stressful," more so for senior and middle managers.

One of the fastest, easiest and least expensive ways to improve the quality of work life is to help your people lighten up. Simia, for example, appoints a "corporate jester" to find and circulate computer jokes, cartoons and funny articles. Oversized "nerd humor" cartoons adorn her department walls. Bulletin boards are filled with candid snapshots of IS staff with goofy captions supplied by co-workers. When things get particularly tense, water gun shoot-outs might break out.

"The biggest thing is you get people through the uncertain times, the crazy times, the times when you get so inundated. It forces people to laugh at themselves and blow off steam," says Simia, also known as The Queen in an office whose other employees include Strawberry, Big Shoe and The Claw.

"We joke around," says Ida Blake, a computer technician in the AARP training division who is mostly known as Princess. "My supervisor is Big Zoo. It's just fun. We keep things upbeat."

ZANY ENVIRONMENT

Upbeat is the name of the game at Southwest Airlines Co. in Dallas, where zaniness flows from Chairman Herb "No One Ever Said Business Had to Be Serious" Kelleher to virtually every department. "We've done things like decorate the cubicles in New Orleans style and have a Mardi Gras," says Bob Rapp, vice president of systems at Southwest.

"As a departmental fund-raiser one year, people could throw water balloons at my face," Rapp says. "We had a big turnout. My first Halloween, they had me dress up in tights. It's not a pretty sight, and I remember telling my wife, 'This is what my career has come to.' "

Although Southwest's IS employees chuckle at the shenanigans, they reserve their highest praise for the heart behind the hilarity. "The first thing that impressed me when I came in the door was the camaraderie," says Jaime Ibarra, a systems engineer at Southwest for three years. "I can talk to anybody, from people in the airport to Herb, on a personal basis. People here are willing to go the extra mile to help you. It may sound hokey, but there's really love among the people here."

What love and zaniness do for Southwest, spontaneity and music do for the folks at Taproot Interactive Studio, a Chicago multimedia development house. "We work damn hard, but we have a pretty loose environment," says manager Curt Galusha. "I've scored tickets to a baseball game and loaded everyone into a bus and said, 'Come on, were going.' Off-the-cuff actions are fun and keep everybody fresh."

Galusha also has found that music hath charms to soothe the savage IS worker. "For some reason, we're all fairly musical here," he says. "Everyone is in a band or a wanna-be band, so almost everyone has a guitar or a keyboard or some drums stashed under the desk. Occasionally, right in the middle of the day, somebody will plug in the guitar and start ripping some stuff off."

Music also works for Simia, who has established an IS chorale that sings in the lobby at Christmastime.

Mark Minasi swears by another type of music. "We do a retreat," says the president of Tech-Teach International, Inc., a provider of technical training seminars in Arlington, Va.

"We get a bunch of beach houses in North Carolina and do miniseminar things, but not like those 'Dilbert' seminars where they have to use two-by-fours to build a bridge," Minasi says. "We've found that one of the most effective team builders is karaoke. The nice thing about karaoke is everyone's a little inebriated, so you can always claim that you don't actually remember that you were there. But if you're singing backup, it becomes a team thing."

Regarding teamwork, Minasi suggests a novel approach to assigning boring jobs: a big board listing "This Month's S_t Jobs." "Everybody gets a certain number of bad-job avoidance credits at the beginning of the year to use any way you'd like. When you've used them up, you get [the boring job]."

Humor, zaniness, love, spontaneity and music have their places, says Daniel Eckert, director of technology at WinkComm, Inc., a builder of online commerce systems in Hoffman Estates, Ill. "But the best way to motivate geeks is to give them toys," he says.

"They like to have toys on the desk — *Toy Story* toys, Mr. Potato Head is always required on at least someone's desk, *Star Wars* characters. One guy built models of all the [*Star Trek*] starships and hung them in his office," Eckert says.

"Real programmers are always into sci-fi movies. In the middle of the day, we'll just shut down and go see *Star Wars* or something. We work 50- to 80-hour weeks, so taking two hours in the middle of a day doesn't bother us," he says.

When it's been a long day, Eckert knows just what his geeks need for a break. "If they've been coding eight or 10 hours, and it's eight o'clock at night, they light up a multiuser game," he says.

"They're huge Doom players, and they have their own clan and Web site," he says. "They spend their free time playing Doom. They don't even want to move from their desks.

"Yeah, toys are big," Eckert says. "In fact, one of our guys, if it's been a bad day, will get on his motorcycle and disappear for two hours and take his pager with him.

"Actually," Eckert says, "that guy's me." □

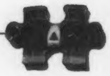
Melymuka is a freelance writer in Duxbury, Mass.

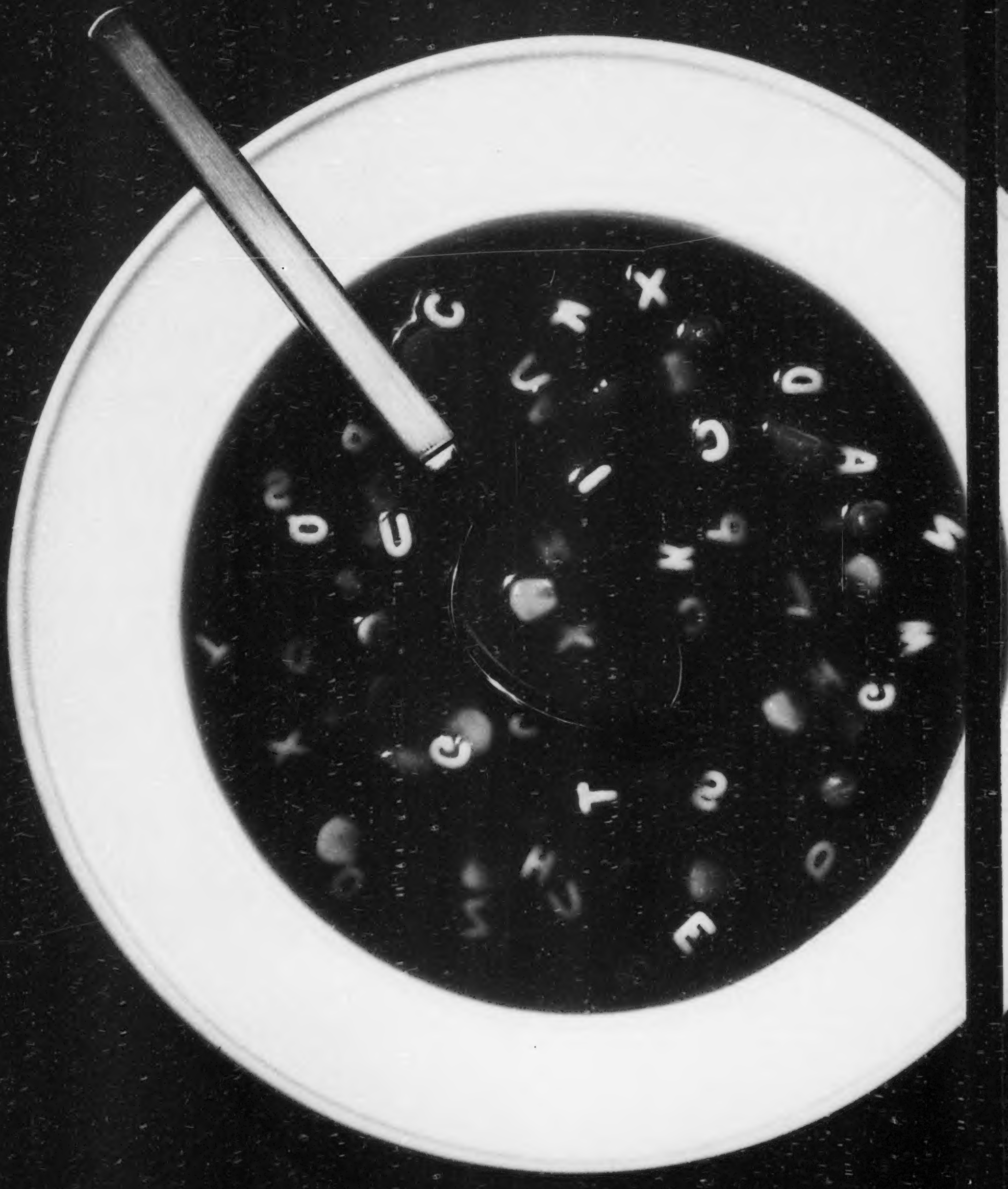
Richard Baynard pulls ahead of Alan Harbaugh (right) and Adair McConnell during an AARP hallway chair race

CHRIS HARTLOVE

COMPUTERWORLD

This week at the Computerworld Broadcast Center (*www.computerworld.com/cbc*), AARP's Jeanne Simia addresses the subject of fun in the workplace.





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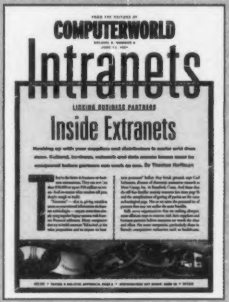

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- 31. Programming Management, Software Developers
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DEPARTMENTAL MANAGEMENT
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OTHER PROFESSIONAL MANAGEMENT
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- 90. Other Titled Personnel

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- (b) Netware
- (c) OS/2
- (d) Unix
- (e) Mac OS
- (f) Windows NT
- (g) Windows
- (h) NeXTstep

App. Development Products ☐ Yes ☐ No
Networking Products ☐ Yes ☐ No
Intranet Products ☐ Yes ☐ No

4. Which of the following products do you buy, specify, recommend or approve the purchase of? (Check all that apply.)
- (a) ☐ Internet software
- (b) ☐ Internet browsers
- (c) ☐ Web authoring/development tools

5. Do you use the Internet? ☐ Yes ☐ No

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RESOURCES: IS MANAGER'S BOOKSHELF

The Digital Estate

By Chuck Martin
McGraw-Hill, New York; $24.95, 217 pages (hardcover)

By Leilani Allen

This is the book for all of those senior executives and managers who have heard about the Internet and still just don't get it.

Martin is employed at IBM. He previously published *Interactive Age* and is closely linked to *Digital Economy* author Don Tapscott's Alliance for Converging Technologies. To some extent, this book is an outgrowth of the earlier effort.

The theme is that the Internet is transforming the ways companies do business, especially as they move from first-generation information sites ("brochureware") to transactional sites where commerce takes place. The new business model of electronic commerce that emerges is one of constant and iterative learning, companies willing and able to reinvent themselves at the drop of a hat, an obsessive focus on the consumer — not just as a revenue source, but as a community of ideas — and an ever-expanding and limitless marketplace.

The book effectively describes the digital estate subculture, chock-full of examples and filled with comments from twenty- and thirtysomething business leaders who passionately believe they're part of a true revolution in business. They thrive on a business reality of transitory products, services, partnerships and competitors, all moving and changing at the speed of light. In the digital estate, this "living on the edge" thrill drives the amazing inventiveness and creativity of those who are banking their futures on the 'net.

TEACHING TOOL

If we take away the glitz and hyperbole, what lessons can this emerging world of commerce teach us? The most intriguing are its definitions of "customer" and "service," which go light-years beyond what most corporations are thinking today. The new model demolishes the idea of static content, replacing it with evermore inventive ways of presenting information that empowers consumers to define their own needs and get their own answers, not the packaged solutions of yesteryear.

THE DIGITAL ESTATE
STRATEGIES FOR COMPETING, SURVIVING, AND THRIVING IN AN INTERNETWORKED WORLD
CHUCK MARTIN
FOREWORD BY DON TAPSCOTT

The greatest value of this book is in solving the mystery of why so many established companies can't make money on the Internet. The digital estate subculture, in which there is often an imperceptible difference between technologist and marketeer, is alien to corporate America. Much of that business model isn't likely to land on your doorstep anytime soon.

That's just as well, because most IS departments aren't well-positioned to play a leading role in the evolution. IS managers need to consider just how they could reposition information from legacy systems to support electronic commerce. They need to consider how they would have to transform their development processes from today's measured approach to the "warp drive" cycle times that the new model demands. They need to understand the new model of user interaction, which includes concepts such as harvesting, herding, splash, hound dogs, repurposing, clickitis and so on. They need to evaluate whether 'net-surfing employees will demand similar interfaces on existing business systems.

Most of all, they need to accept a world where technology doesn't just support the business, but *is* the business. ☐

Allen is a Computerworld *columnist and a director at Tenex, a management consulting firm in Burlington, Mass.*

WEB SITES

By Leslie Goff

Computer News Daily

nytsyn.com/live/Latest/

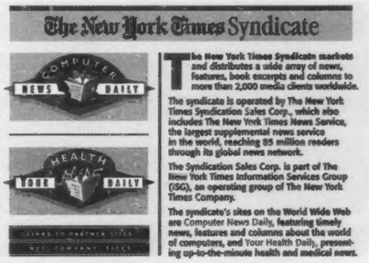
Make this part of your morning surfing routine for quick access to the major computer news headlines from relevant newspapers around the country. For example, a Compaq Computer Corp. announcement is likely to be covered by a reporter from the *Houston Chronicle* who follows the locally based PC maker.

Vendor news, new product developments and user news are all included. Although you can link to the original source, all the articles you need are here in a self-contained space for convenient access. When you have the luxury to linger, check out the special section on Microsoft Corp. CEO Bill Gates, participate in the ongoing discussion groups or peruse the news archives by category. A search engine also is available.

Cable Datacom News

CableDatacomNews.com/current.htm

Keep an eye on this site to keep up with the growing market for cable modem access to the Internet. Cable modems have the potential to replace Integrated Services Digital Network and other forms of high-speed data services for small-office/home-office users, including telecommuters and, possibly, corporate Internet access. Your users will likely ask about them the next time their 28.8K bit/sec. modems disconnect unexpectedly from the Internet, so check here for the lowdown on vendors, service providers and the latest news and developments. Standard features include a useful list of frequently asked questions, a complete listing of cable modem trials across the country and links to relevant vendor sites.



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The syndicate's sites on the World Wide Web are Computer News Daily, featuring timely news, features and columns about the world of computers, and Your Health Daily, presenting up-to-the-minute health and medical news.

Goff is a freelance writer in New York.

JULY'S TOP CONFERENCES

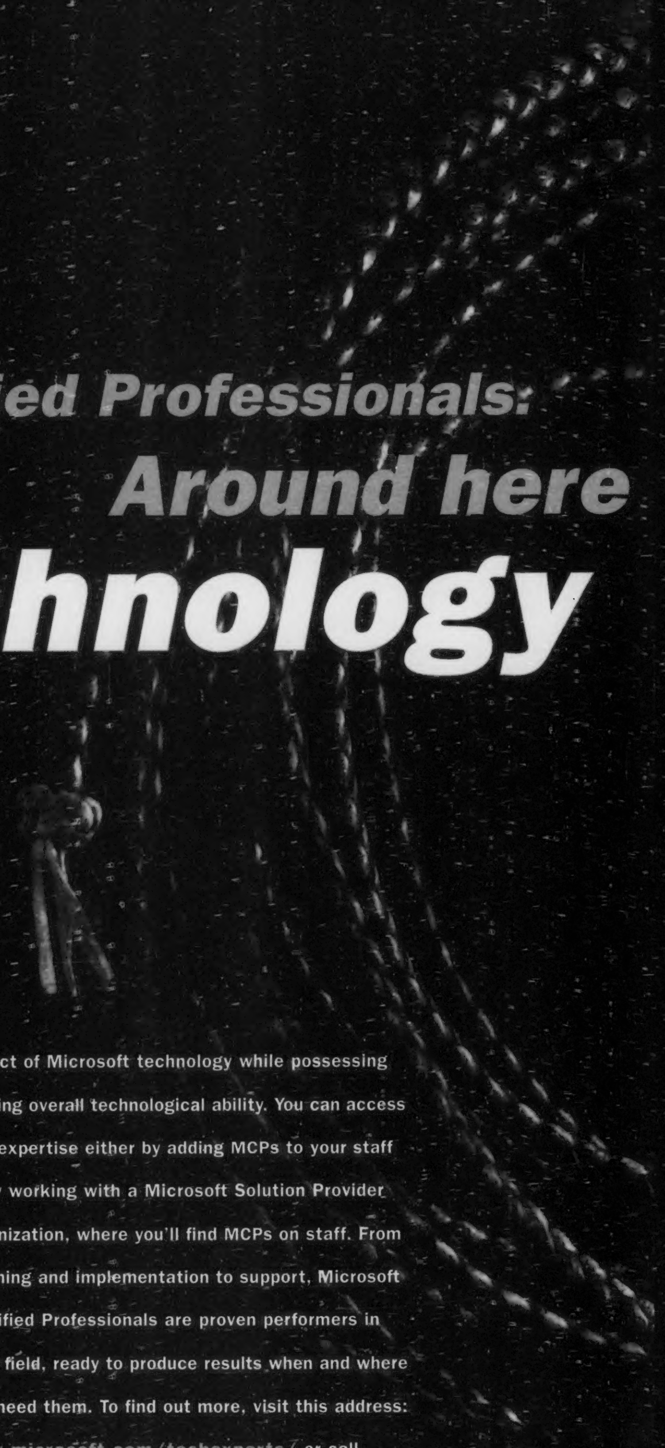
For a complete listing of IS conferences, see @Computerworld's events calendar at *www.computerworld.com/toolbox/conferences.html.*

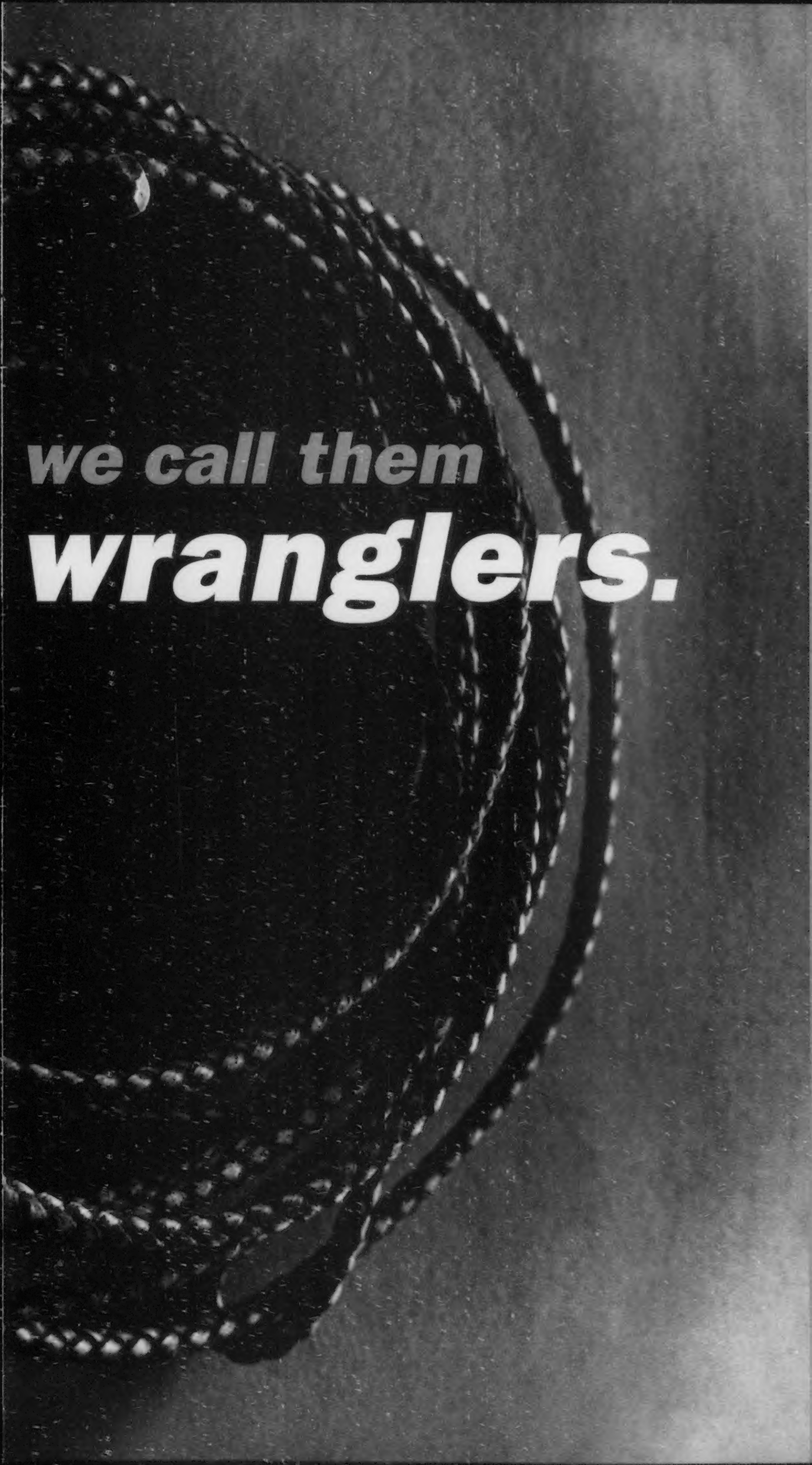
- **The National Center for Database Marketing '97: Strategies for Success.** *Chicago, July 23-25 — Leading-edge examples of making money off databases from the marketer's point of view. Contact: Cowles Business Media, Stamford, Conn. (800) 927-5007.*

- **Daratech Intranet/Web Strategies for Engineering and Manufacturing '97.** *Los Angeles, July 28-30 — Computer-aided design and manufacturing's top boutique market research firm checks out the World Wide Web. Contact: Thomas J. Graves at Daratech, Inc., Cambridge, Mass. (617) 354-2339; E-mail: daratech@daratech.com.*

- **Object World West.** *San Francisco, July 21-25 — Understand application development in a net-centric corporate environment. Contact: Softbank/Comdex, Needham, Mass. (617) 433-1500; E-mail: sci@comdex.com.*

- **DCI's Data Warehouse World and Sales Force Automation Conference & Exposition.** *New York, July 29-31 — Contact: Digital Consulting, Inc. (DCI), Andover, Mass. (508) 470-3880; E-mail: ConfRef@dciexpo.com.*




we call them
wranglers.

PETER G. W. KEEN

YEAR 2000: GIVE UP, MOVE ON – NOW

Don't even try to solve the year 2000 problem. You can't fix it, and the cost of trying will put your firm's infrastructure at risk. Accept defeat. Dump your old infrastructure, and get one that's year 2000-safe, even if it isn't perfect.

Do it now to save your IS organization — and maybe even your company.

The essential role of the IS organization is to guarantee the integrity of corporate IT infrastructures. Everything else — application development, operations and support — can be handled, in part or in whole, by external sources or other internal IT groups. Integration of networks, information warehouses and process flows can't be handled piecemeal. When they are, the later costs of repairing multitechnology chaos grow exponentially. Of course, it's IS that has to pick up the pieces.

IS organizations will be in the infrastructure fix-up business for many years. That's the good news. The bad news is that we can forget about infrastructure development for the foreseeable future. The year 2000 crisis almost guarantees that. Year 2000 is like a massive penalty tax that slashes the discretionary budget by 25% or more. IS budgets are already too small to meet business needs for new applications. That's apparent in *Computerworld*'s recent annual job satisfaction study [May 26], in which 80% of IS professionals reported their jobs were stressful and 41% stated their job satisfaction was decreasing. Internet, intranet and extranet investments have to come out of an already overstrained staff and money resource base, and as the survey shows, IS is under siege. Year 2000 slashes the resources and wrecks prioritization.

Infrastructure gets wiped off the priority list in that situation. There's no way executives will sanction proposals for large-scale infrastructure investments in that context. That means IS won't be able to invest in what the business must have for the longer term: efficient consumer response, electronic commerce, data warehousing/mining, business process re-whatever it's called this week and supply-chain management. All of those rest on an integrated enterprise IT platform. On top of that, there's the growing complexity of keeping thousands of desktop users content, their software updated, all the servers humming and the viruses killed off.

IS managers and professionals had better come up with creative ways of designing and sourcing infrastructure projects. The best strategy is to turn the year 2000 problem into the infrastructure solution. The problem is far worse than even the pessimists believe. Gartner Group's much-cited figure of $600 billion to fix it is misleading. If God or Bill Gates wrote out a check for the full amount, nothing much would change. The year 2000 problem is a people- and time-resource issue, not just a financial one. You can't buy the time at any price.

Accept the year 2000 defeat now. Go for a clean, new infrastructure as fast as possible. Dump what you have and implement a comprehensive capability that's already year 2000-safe. Options include SAP's R/3 — notoriously complex and clumsy, but for many firms the best way they can back into integration — and Oracle's template approach to application development based on a sound database infrastructure. Above all, there are the four components of corporate Internet/intranet computing: TCP/IP for solving the telecommunications infrastructure problem, hypertext for limited but adequate data integration, the browser as the first major user access and procedure tool in which there's no need for training and the server/firewall as glue.

My message to IS executives and professionals: The real calamity ahead won't come in 2000 but in 2001, when inevitable year 2000 failures across the business, banking, supply chain and government landscape are compounded by missing new infrastructure, more job stress and more overload in fixing worn-out components of today's IT complexes. IS won't survive as a profession if this occurs — we'll see the biggest wave of outsourcing and purging ever.

The business-technology alignment that the field has worked so hard to create will be dead. Don't let the calamity happen. □

Keen can be contacted at www.peterkeen.com. *His new book,* The Process Edge: Creating Value Where it Counts, *was published this month by Harvard Business School Press.*

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f.y.i.

A 'True Confessions' for IS

Everybody knows they're out there: those ugly, messy IS disasters that shred budgets, timetables and careers.

If only we could get the inside story on what went wrong, we could — maybe — avoid the same fate ourselves.

That's the idea behind *Failure & Lessons Learned in Information Technology Management*, a new quarterly journal from Cognizant Communication Corp. in Elmsford, N.Y. In it, academic researchers examine information systems projects that failed to deliver results, and determine how the project got off track and the lessons to be learned from the failure.

The first edition examines, among others, the U.S. Food and Drug Administration's attempts to streamline its drug-approval process through document management, and an electronic trading system at the London Stock Exchange.

The reports are written in an academic style, but deal with nitty-gritty issues such as poor reporting structures, changing system requirements and even the effect a "fear-based culture" has on a development effort.

Editor in Chief Jay Liebowitz, a professor in the department of management science at The George Washington University in Washington, says he already has enough failure stories to fill his next two issues. He notes that his offer of anonymity helps make subjects more cooperative.

Cognizant Communication Publisher Robert Miranda says about 200 people have signed up for subscriptions, which start at $70 per year.

Cognizant can be reached at (914) 592-7720 or via electronic mail at cogcomm@aol.com.

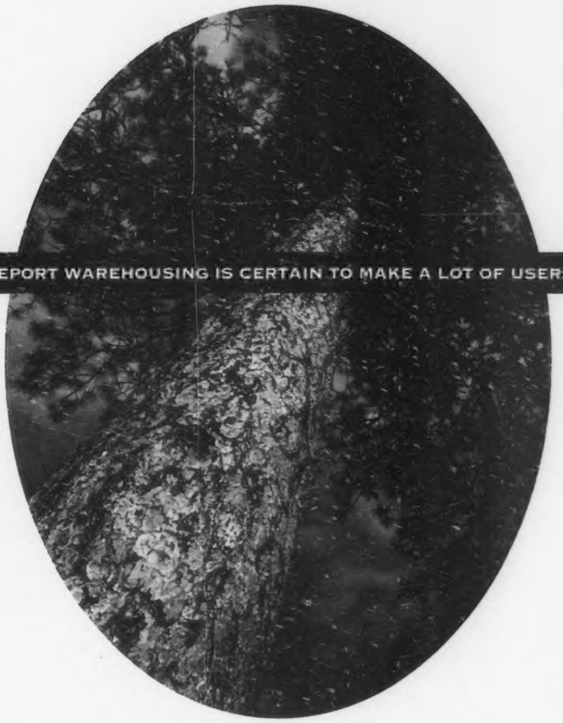
Liebowitz can be reached at (202) 994-1000.

— Robert L. Scheier

Anything familiar on this list?

Following is a list of some "critical failure factors" common to many unsuccessful IS projects from the article "Information Systems Failure: Identifying the Critical Failure Factors," by Stephen Flowers, published in *Failure & Lessons Learned in Information Technology Management*:

- Leading-edge system
- Project timetable slippage
- Poor reporting structures
- Complexity underestimated
- Overcommitment
- Fear-based culture
- Poor consultation
- Changing requirements
- Poor training
- Technology focus
- Inadequate testing



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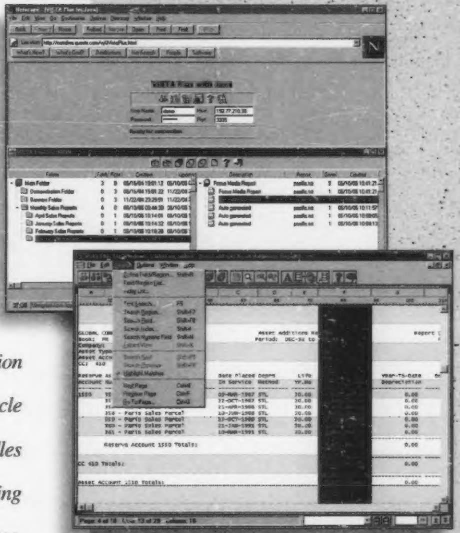

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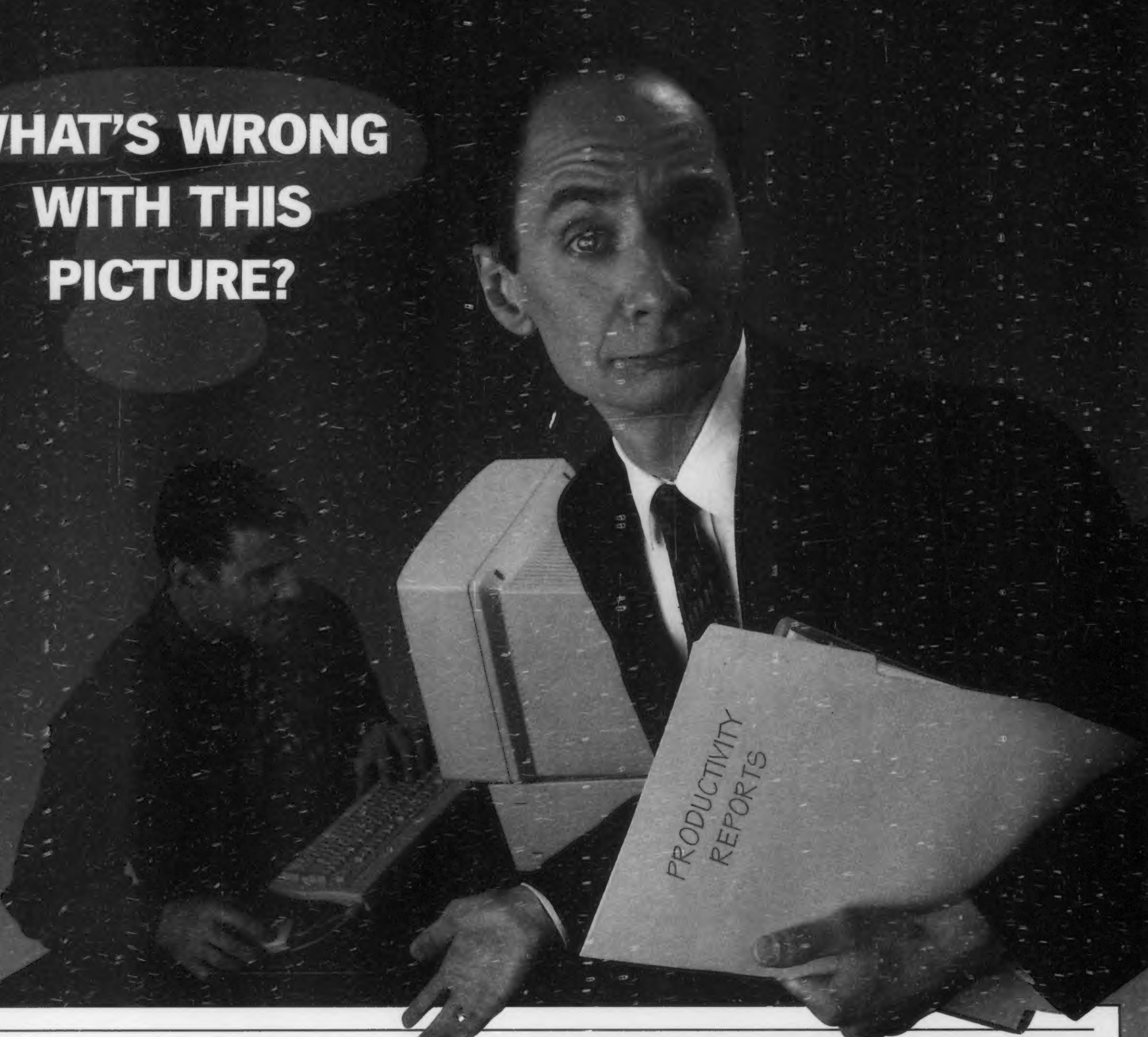
WHAT'S WRONG WITH THIS PICTURE?



What's wrong is that it appears "Joe Worker" is hard at work. But what's really going on is frivolous surfing.

The truth is 40-60% of Internet activity is spent in unproductive sites and all this "inactivity" is costing corporations thousands of dollars in lost productivity. Employees may look busy but the reality is they're spending too much time in non-business related sites.

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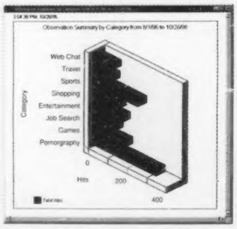

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PC MAGAZINE EDITORS' CHOICE
May 6, 1997
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Buyer's Guide

PRODUCT REVIEW

Computerworld and Client/Server Labs found that dual-processor Pentium Pro servers score well as intranet hosts until the load passes 360 clients

Double play!

THE POPULARITY OF INTRANETS IS raising the performance bar for workgroup servers. These machines must do more than just provide access to data and images inside and outside of relational database systems. They are also required to carry out these duties by speaking the language of World Wide Web browsers to communicate with their clients.

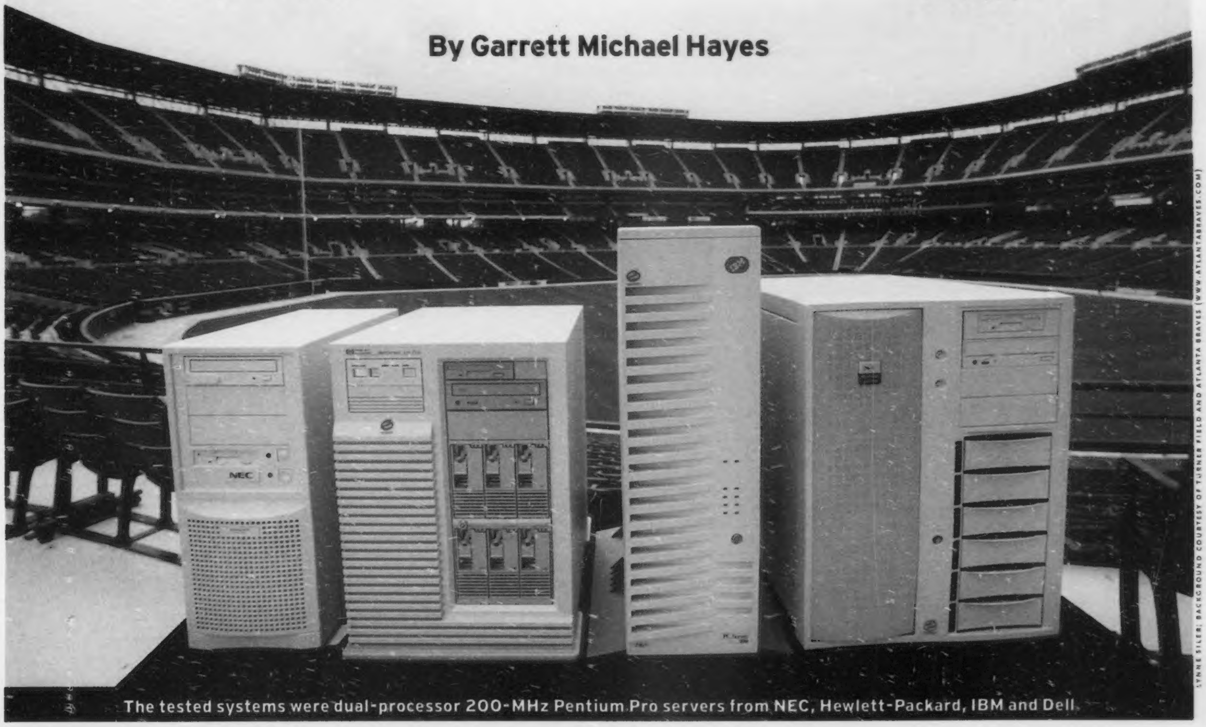
The current crop of dual-processor PC servers based on Intel Corp.'s Pentium Pro chip are increasingly being utilized as intranet servers for workgroups within large organizations and at entire smaller companies. As a group, these machines seem to do a good job of hosting an intranet with up to 360 clients. But when the load reaches 480 clients, performance falls off dramatically.

To address the requirements of intranets, we tested four similar

Hewlett-Packard and Dell topped most of the intranet tests, although NEC pulled ahead when price/performance was considered

Double play, page 88

By Garrett Michael Hayes



The tested systems were dual-processor 200-MHz Pentium Pro servers from NEC, Hewlett-Packard, IBM and Dell.

LYNNE SILER; BACKGROUND COURTESY OF TURNER FIELD AND ATLANTA BRAVES (WWW.ATLANTABRAVES.COM)

PRODUCT REVIEWS

Double play!

CONTINUED FROM PAGE 87

dual-processor Pentium Pro systems: The PowerEdge 4100/200 from Dell Computer Corp.; the NetServer LH Pro from Hewlett-Packard Co.; the PC Server 330 from IBM; and the Express5800 LE2000 from NEC Computer Systems Division. They were selected as representative of the dual-processor Pentium Pro marketplace. (Compaq Computer Corp. declined to participate.) The systems were tested running Client/Server Labs' IntraMark1 benchmark, which measures performance by simulating a mixture of the most important types of Web server requests (See "How we did it" below).

Results

The servers we tested kept up with the demands of 120 simulated clients, but none carried the weight when we tried to simulate 480 clients. Three of the four — HP, Dell and NEC — handled 360 clients, and IBM met the demands of only 240 clients before performance fell below 95%.

HP's NetServer LH Pro turned in the best overall result with a final score of 1,491 at 360 clients, but Dell's PowerEdge 4100/200 was hard on HP's heels.

The NEC Express5800 LE2000 remained in the pack with its overall score, but then it pulled ahead of HP and Dell in price/performance. IBM's PC Server 330, placed last in both performance and price/performance.

Suitability

Our testing indicates that the dual-processor Pentium Pro workgroup-class servers as a class can definitely keep pace with the demands on an intranet for fairly large workgroups. But the performance of the individual systems varied significantly as the workload increased.

In the final analysis, the NEC system clearly represents a good value for the price. That said, the HP and Dell systems turned in substantially higher results than the other systems — commensurate with their higher prices. Users will need to decide for themselves if the difference in the price/performance factors are justified by the added features of each system.

NEC SCORES WITH LOW PRICE

	Score/number of clients	Price	Price/performance factor
IBM	1,157 / 240	$14,123	509
HP	1,490 / 360	$15,560	290
DELL	1,448 / 360	$14,546	279
NEC	1,141 / 360	$9,656	235

HOW WE DID IT

The test

We sought to determine the ability of each system to handle the demands placed on intranet servers by testing them with Client/Server Labs' IntraMark1 benchmark.

For this comparison, each of the machines was equipped with 256M bytes of RAM, dual 200-MHz Pentium Pro processors, 512K bytes of write-back cache — the NEC system was delivered with 256K bytes, but a 512K-byte NEC system is available — a 10M/100M bit/sec. Peripheral Component Interconnect (PCI) Ethernet adapter and 8G bytes or more of disk storage. Each system ran Microsoft Corp.'s Windows NT 4.0 (Service Pack 2), with Oracle Corp. Web Server 2.1 software and Oracle Workgroup Server 7.3 as the database engine.

Each server was connected to a 100Base-T Ethernet backbone, and the load simulators were connected to a 10Base-T switch.

The IntraMark1 stresses a complete system with a combination of traditional Web content and more involved database access requests. Custom 32-bit client software performs the same network functions as a Web browser, simulating a complex workload. Multiple "virtual clients" operate as a "virtual group" on a single Windows NT computer, making independent data requests of a Web server.

Each virtual group simultaneously creates five classes of load during the test. They are Hypertext Markup Language (HTML), graphics interchange format (GIF), decision-support system (DSS), online transaction processing (OLTP) and binary large objects (Blobs) retrieval. The Web server software passes the database requests to a relational database using Common Gateway Interface scripts and returns the results to the Web clients.

A standard IntraMark1 test simulates one group of 40 virtual clients (one OLTP client, three DSS clients, four Blobs retrieval clients, 16 HTML clients and 16 GIF clients) for each NT workstation enabled in the test. Each workstation executes a group of requests. The maximum workload is 1,920 simulated clients.

Each request is counted and the total compared with the count of failed requests. A "success ratio" is calculated for each workload, and the geometric mean of those ratios is the IntraMark1 result for that load.

Scaling stops when the error rate meets or exceeds 5%. The final IntraMark1 score is the highest result to that point, along with the client load at which that score was achieved.

Finally, we divide the cost of the system by the product of the final IntraMark1 score and client load, then multiply by 10,000 to yield a price/performance factor. For example, for a $10,000 system that scored 800 at 240 clients, the price/performance factor would be 520, calculated as 10,000 x (10,000/(800 x 240). □

HP AND DELL WIN MOST CATEGORIES

TEST	CLIENTS			
	120	240	360	480*
OLTP	HP (428)	Dell (680)	Dell (1,010)	HP (1,052)
DSS	Dell (563)	Dell (913)	Dell (1,155)	Dell (1,132)
Blobs	HP (676)	HP (1,012)	HP (1,456)	HP (1,365)
HTML	NEC (1,450)	HP (2,953)	HP (2,746)	HP (2,280)
GIF	NEC (1,525)	HP (3,104)	HP (2,772)	HP (2,259)
OVERALL	Dell (771)	HP (1,284)	HP (1,991)	HP (1,503)

* All machines fell below acceptable completion rates when serving 480 clients.

Hayes is systems control manager at Client/Server Labs, Inc. in Atlanta, a primary test partner of Computerworld.

Double play, page 92

Yes, tell me how IntelliStation can help me do what I do best.

Name ....

Title or Position ....

Company Name ....

Address ....

City .... State .... Zip ....

Phone Number .... E-mail Address ....

Nature of business:

- ☐ Advertising/Marketing
- ☐ Digital Content Creation/Visual Media
- ☐ Electrical Engineering/Design
- ☐ Financial Services
- ☐ Mechanical Engineering/Design
- ☐ Software Engineering/Design
- ☐ Other ....

Hardware used:

☐ IBM ☐ HP ☐ SUN ☐ SGI
☐ Compaq ☐ Mac ☐ Digital ☐ Other ....

No. of workstations in your company:

☐ 1–10 ☐ 11–50 ☐ 51–100
☐ 101–500 ☐ 500+

No. of workstations you intend to purchase in the next 12 mos.:

☐ 1–10 ☐ 11–50 ☐ 51–100
☐ 101–200 ☐ 201–500 ☐ 500+

Operating System:

☐ Mac ☐ Windows 95
☐ UNIX ☐ Windows NT ☐ Other ....

MW02

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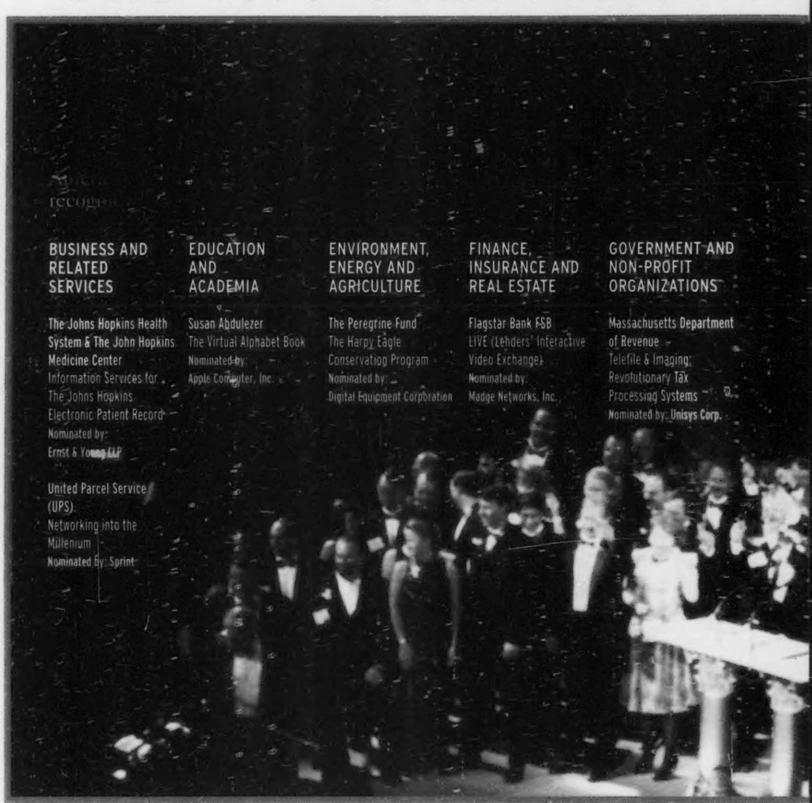
[1] *MHz denotes internal clock speed of the microprocessor only; other factors also affect application performance.*

Inno

THE 1997 COMPUTERWOR



recogni

BUSINESS AND RELATED SERVICES

The Johns Hopkins Health System & The John Hopkins Medicine Center
Information Services for The Johns Hopkins Electronic Patient Record
Nominated by:
Ernst & Young LLP

United Parcel Service (UPS).
Networking into the Millenium
Nominated By: Sprint

EDUCATION AND ACADEMIA

Susan Abdulezer
The Virtual Alphabet Book
Nominated by:
Apple Computer, Inc.

ENVIRONMENT, ENERGY AND AGRICULTURE

The Peregrine Fund
The Harpy Eagle Conservation Program
Nominated by:
Digital Equipment Corporation

FINANCE, INSURANCE AND REAL ESTATE

Flagstar Bank FSB
LIVE (Lenders' Interactive Video Exchange)
Nominated by:
Madge Networks, Inc.

GOVERNMENT AND NON-PROFIT ORGANIZATIONS

Massachusetts Department of Revenue
Telefile & Imaging: Revolutionary Tax Processing Systems
Nominated by: Unisys Corp.

The 1997 Collection

Finalists are noted in red.

BUSINESS AND RELATED SERVICES

- **ADP News Partner.** Investment Software Systems, ADP, Inc.
- **American Century Investments.** On Line Account Access
- **AT&T Result Management Group.** Results Management Information Network (RMIN)
- **AutoNation.** AutoCash
- **BEA Systems, Inc.** BEA Enterprise Transaction Framework
- **Bell Atlantic.** SaleService Negotiation System (SSNS)
- **Bell Atlantic InfoSpeed.** InfoSpeed
- **Bell Sygma Inc.** Total Information Access System (TIAS II)
- **Brooktrout Technology, Inc.** Brooktrout TR114 Series
- **Cisco Systems.** Cisco Global Networked Business Model
- **Compaq Computer Corporation.** TOPS (Total Order Planning System)
- **Corporate Customer Business Unit, Telkom South Africa.** Customer Empowerment Infrastructure
- **CyberSlice, Inc.** CyberSlice
- **Dr. Pepper/Seven Up, Inc.** Decision Support System
- **Florida Power Company.** Customer Service System
- **GE Medical Systems.** InSite
- **Globalstar.** Globalstar
- **Hallmark Cards, Inc.** Enterprise Network
- **Hill's Pet Nutrition, Inc.** Partners
- **Hitachi Semiconductor (M) Sdn Bhd.** IMPACT - An Integrated Workflow System
- **Infocamere S.C.P.A. - Padua - Italy.** IMAGING
- **Lowe's Companies.** MIS Help Desk Vendor Escalation
- **Magic Solutions Inc.** SupportMagic
- **Manpower Inc.** PowerBase
- **Nas-Hamilton Group.** Cencon System [illegible] 6.1-07
- **MCI Telecommunications.** [illegible]
- **MCI Telecommunications/Enterprise Systems Management.** Distributed Systems Management
- **Merck & Company, Inc.** Procurement Re-engineering Project
- **Ministère de l'Industrie.** BAE - Bourse d'Affaires Electronique
- **NETCOM.** NETCruiser
- **Network Solutions, Inc.** Internet Network Information Center
- **New Brunswick Telephone (NBTel).** Infocosm Phone Store
- **Nobody Beats the Wiz.** The WIZ Interactive Shopping Experience (WISE)
- **Pacific Telesis Group.** TELSTAR (TELesis STrategic Application Replacement) Project
- **QUALCOMM Incorporated.** Code Division Multiple Access (CDMA)
- **Reltec.** Totally Integrated Enterprise (TIE)
- **Southern California Edison.** Technology Standards
- **SPSS Inc.** Pivot Tables
- **T.D. Brown, Inc.** Seniors 2000/Advanced Digital Imaging
- **Texas Instruments'** Innovation Website Team.TI Tomorrow
- **Texas Instruments** – Office of Best Practices. Best Practice Sharing
- **The Dow Chemical Company.** Diamond Services
- **The Good Guys! Dream Stream:** The Implementation of HR Stream
- **The Johns Hopkins Health System & The John Hopkins Medicine Center.** Information Services for The Johns Hopkins Electronic Patient Record
- **The Sharper Image Corp.** WebObjects online catalog system
- **United Parcel Service (UPS).** Networking into the Millenium
- **United Parcel Service (UPS).** The Information Library
- **United Services Automobile Association (USAA).** Database Management Reorganization Project
- **VeriFone, Inc.** Low Cost Credit Card Authorization Terminals
- **Victoria's Secret Stores.** Data warehouse!
- **Visioneer, Inc.** Paperport
- **Wal-Mart.** Inventory Management
- **Yarra Valley Water Ltd.** Easy Access and Propertyflow image and data retrieval system

EDUCATION AND ACADEMIA

- **Abita Springs Elementary School.** Hypertext Folklife Curriculum Project
- **Ames Laboratory.** Undergraduate Computational Engineering and Science Project (UCES)
- **Aptex Software Inc.** VITAL [illegible]
- **Arizona State University.** ASU Data Warehouse/Class Roster Reporting System
- **Babson College.** ViDi-0 Enabled - View It and Do It Online
- **Board of Regents of the University System of the Georgia Office of Information and Instructional Technology.** Galileo Project
- **Canadian Museum of Civilization.** New Media Infrastructure
- **Chipeta Elementary School.** The CHIPETA/MCI Alliance
- **Collier-Sierra.** Multimedia Encyclopedia
- **Computelec Australia.** The Student Notebook Access Program (SNAP)
- **Computer Curriculum Corp.** Educational Software Solutions
- **Desert Sands Unified School District.** Microwave Metropolitan Area Network
- **Drakensberg Boys' Choir School.** Music Technology Instruction in the Classroom
- **Eastman School of Music, University of Rochester for Multimedia Programming.** Music Instruction
- **Genentech, Inc.** Access Excellence: Helping America's Biology Teachers Make the Grade
- **Greene County Technology Consortium.** Greene County Education Initiative
- **Hacienda La Puente Unified School District.** HLPnet Community Learning Network
- **Harris County School System.** Elementary Large Distributive Network
- **Harvard University, Graduate School of Business Administration.** Harvard Business School Intranet
- **Infonautics Corp.** Electric Library(TM)
- **Jet Propulsion Laboratory.** Kidsat
- **Kansas City, Missouri School District.** Wide-Area Digital Network
- **Memorial University of Newfoundland.** Virtual Campus
- **Metro Educational Cooperative Service Unit for Envision It! Computational Science.** Teaching & Learning
- **MnSCU/PALS.** WebPALS
- **National Geographic Society.** National Geographic Kids Network
- **Orange County Public Schools.** Museum Resource CD
- **Outdoor Online.** Internet T-1 World Wide Web
- **Partners in Education.** Towards a Winning Nation
- **Pine Ridge School.** Distance Learning-Pine Ridge School
- **Plano Texas School District.** WideDistrict Network
- **PRIDE Media.** Pride! Fights AIDS
- **Rochester City School District's Theodore Roosevelt School No. 43.** Rochester City School No. 43 Web Site
- **San Jose Unified School District.** San Jose Unified School District Technology Project
- **Stanford Law School.** The Securities Class Action Clearinghouse
- **Sun Microsystems.** Net Day
- **Susan Abdulezer.** The Virtual Alphabet Book
- **The Catlin Gabel School.** Campus-Wide Educational Network
- **The Children's Partnership.** America's Children & The Information Superhighway: Parent Involvement Project
- **The Franklin Institute Science Museum.** Science Learning Network
- **The National Council of Educational Opportunity Associations (NCEOA).** TRIO
- **University of Illinois-Administrative Information Systems.** Class Manager
- **West Virginia Department of Education.** WORLD SCHOOL PROGRAM
- **Willoughby Associates, Limited.** Multi MIMSY
- **Words+.** Pegasus Lite Augmentative Communication System
- **Xerox Adaptive Products.** The Reading Edge

ENVIRONMENT, ENERGY AND AGRICULTURE

- **Air Products & Chemicals, Inc.** ChemKey
- **Arizona Public Service Company.** Materials Logistics Information System
- **Bright Wood Corporation.** Optimizing cut plant for the lumber remanufacturing industry (Plant 11)
- **British Petroleum.** Virtual Teamwork
- **Consolidated Edison of New York, Inc.** Interactive Customer Communications
- **Cyberlab, Inc.** Computerized Robotic Manipulation
- **Detroit Edison Company.** Corporate Real Estate(CRES) Imaging/ Database System
- **Jet Propulsion Laboratory/California Institute of Technology.** Linkwinds, the Linked Windows Interactive Data System
- **KN Energy, Inc.** KN's Energy Market
- **Mobil Exploration & Producing U.S. Inc.** Automated Field Systems
- **Molten Metal Technology, Inc.** Catalytic Extraction Processing (CEP)
- **National Center for Atmospheric Research.** Development and Use of the Climate System Model
- **Niagara Mohawk Power Corporation.** Nostradamus Forecasting System
- **Nuclear Document Management System, Southern California Edison.** Nuclear Document Management System (NDMS)
- **PacifiCorp.** Customer Service Systems (CSS)
- **RAPID, Inc.** PowerAg Network
- **SAIC.** STOrage and RETrieval System (STORET)
- **Science Applications International Corporation (SAIC).** Plasma Hearth Process (PCP)
- **Shell Malaysia Trading Sdn Bhd.** The Business Reengineering Journey
- **The Peregrine Fund.** The Harpy Eagle Conservation Program
- **U.S. Environmental Protection Agency(EPA)/SAIC.** Safe Drinking Water Information System (SDWIS)

FINANCE, INSURANCE AND REAL ESTATE

- **Advance Bank AG, Munich, Germany.** APOLLO-Call Center and Back-Office Solution for Building a Virtual Bank
- **American General Life & Accident Insurance Company.** SmartPad/POS System
- **American National Bank.** Mobile Solutions for Banking
- **Banc One.** TRIUMPH Integrated Correspondence System
- **BankBoston.** Retail Delivery Project
- **BlueCross BlueShield of Louisiana.** Workplace
- **BlueShield of California.** Health Care Insurance. Improving Access to Customer Service
- **CheckFree Corporation.** CheckFree E-Bill
- **Cityscape Corp.** Cityware - Loan Origination System
- **Commercial Union Insurance Companies.** Empowering Field and Agency Work Force By Client Server Technology
- **Fannie Mae.** MORNETPlus
- **First Data Corporation.** USA Value Exchange
- **First Union National Bank.** Remote Banking Service
- **Flagstar Bank, FSB.** LIVE (Lenders' Interactive Video Exchange)
- **General Electric Company.** Financial Foundations Course
- **General Motors Acceptance Corp.** Express Ap Processing System
- **Johnson & Higgins.** J&H RiskStrategist
- **KeyCorp.** Composite Banking
- **Komercni Banka.** Online banking
- **Nasdaq Stock Market, Inc.** Nasdaq Web Site
- **R+V Allgemeine Versicherung AG.** Integrated Decision Support System (DSS) - Profit & Loss
- **Royal Bank of Canada.** Portfolio Query System (POS)
- **Sallie Mae.** ImDoc
- **Security First Group.** Integrated Voice Response System\Loans
- **Sedgwick, Inc.** INFORM™
- **SEGA, Swiss Securities Clearing Corporation.** SECOM (SEGA COMMUNICATION SYSTEM)
- **Standard Chartered Bank.** Document Imaging and Workflow Technology
- **Unibanco, S.A.** Technology enabling two big banks integration

GOVERNMENT AND NONPROFIT ORGANIZATIONS

- **AAMVAnet, Inc.** Advantis
- **American Cancer Society.** Funding Analysis and Reporting System (FARE)
- **An Post (The Irish National Post Office).** CounterAction
- **Applied Network Solutions, Inc.** Kids Identification Digital Software (K.I.D.S.)
- **California Department of Health Services, Accounting Section.** CALSTARS STARGAZE
- **California Department of Motor Vehicles.** The MONARCH Project: California Department of Motor Vehicles Improves Legal Presence Verification Process
- **California Highway Patrol Information Management Division.** CHP Statewide Information Network
- **Casey Family Program.** Casey Information System(CIS)
- **Centers for Disease Control, Epidemiology Program Office.** MMRW OnLine
- **City of Escondido.** Technological Enablement of Community-Oriented Government
- **Department of Defense – Deputy Under Secretary Defense (Acquisition Reform/Electronic Commerce).** Web Technology for Central Contractor Registration (CCR)
- **Department of Education, Employment, Training and Youth Affairs.** Automated Job Selection (AJS)
- **Department of Treasury.** Treasury Communications System
- **Essex Police.** Essex Police Integrated Computer System (EPICS)
- **Federal Communications Commission (FCC) Auctions Division.** FCC Remote Electronic Auction System
- **First Chicago/Mercantile Services L.L.C.** Electronic Federal Tax Payment System (EFTPS)
- **Fund for the City of New York.** Midtown Community Court, Court Application
- **GGTech.** Handicapped Users' Database - IBM Special Needs Forum
- **Immigration and Naturalization Service.** Secure Electronic Network for Travelers Rapid Inspections (SENTRI)
- **Information Management Department of the Naval Air Warfare Center.** Transition to Accommodate the New Organization
- **Intelenet Commission.** ACCESS INDIANA: CONNECTING PEOPLE AND INFORMATION THROUGH TECHNOLOGY
- **KPMG Peat Marwick LLP.** Talking User Interface for Governmental Accounting Applications
- **Lake County.** Virtual Government Center Web Site
- **Los Alamos National Laboratory.** Integrated Document Exchange (INDEX) Project
- **Los Angeles Police Department.** Mayor's Alliance for a Safer Los Angeles and COPS MORE Projects
- **Maricopa County Recorder.** Recorder's Document Information System
- **Massachusetts Department of Revenue.** Telefile & Imaging: Revolutionary Tax Processing Systems
- **Massachusetts Registry of Motor Vehicles.** RMV Internet Initiative
- **Metropolitan Toronto Police.** METROPOLIS
- **Michigan Medical Services Administration.** Michigan Medicaid Decision Support Project
- **Ministere de la Culture (France).** Service Public d'Information sur le Patrimoine Culturel (SPIC)
- **National Center for Missing and Exploited Children.** National Center for Missing & Exploited Children's Web Site
- **National Science Foundation.** NSF FastLane Project

vators

LD SMITHSONIAN AWARDS

MANUFACTURING	MEDIA, ARTS AND ENTERTAINMENT	MEDICINE	SCIENCE	TRANSPORTATION
Buckman Laboratories, Inc. Knowledge Sharing Nominated by: Ernst & Young LLP	Rock the Vote 1-800-REGISTER Nominated by: MCI Telecommunications Corporation	InterMountain Health Care Quality Care Tracking Project Nominated by: NeXT Software, Inc. United States Environmental Protection Agency Supercomputer Simulations of the Human Lung Nominated by: Silicon Graphics/Cray Research	The Center for Analysis and Prediction of Storms & Pittsburgh Supercomputing Center Severe Storm Forecasting Nominated by: Silicon Graphics/Cray Research	Hongkong International Terminals Limited Productivity Plus Program (3P) Nominated by: Hewlett-Packard Company

The Computerworld Smithsonian Awards

June 9, 1997 • Washington, D.C.

- **NAVIDEC Inc. for Integrated Visitor Information System of Colorado.** The Colorado Outdoor Recreation Resource Project
- **New York City Department of Information Technology and Telecommunications (DoITT).** Tow Eligibility Interrogation Terminal (TowIT)
- **Norand Corporation.** PEN* Key 6300 Hand Held Terminal
- **NOVA Private Industry Council.** Youth@Work
- **Office of Defense Programs, U.S. Department of Energy.** Accelerated Strategic Computing Initiative (ASCI)
- **Pennsylvania State Police.** Development of Enterprise-wide Information Technology
- **Pension Benefit Guaranty Corp.** Premium Accounting System
- **Philippines' Social Security System (SSS).** Executive Information System (EIS)
- **Plugged In.** Plugged In – Bridging the Technological Gap
- **Politie Midden en West Brabant.** Five minutes before 12 or Project 11th hour
- **Rome Laboratory.** Cronus/Corbus Distributed Computing Environment
- **SEMI (Semiconductor Equipment and Materials International).** SEMI OnLine
- **Spanish General Treasury of Social Security.** Spanish Social Security Smart Card
- **State of California, Franchise Tax Board.** Collection Account Processing System (CAPS)
- **State of Georgia Environmental Protection Division of the Department of Natural Resources.** Enhanced Emmission Inspection and Maintenance Program
- **State of Oregon Dept. of Human Resources.** Oregon TRACS (Transition, Referral, and Client Self-sufficiency)
- **Swedish National Police Board.** [illegible]
- **Telkom SA Ltd.** Impendulo
- **Texas Department of Health.** TexMedNet
- **Texas Department of Protective and Regulatory Services.** CAPS (Child and Adult Protective System)
- **Texas Transportation Institute & U.S. Department of Transportation.** ALERT - Advanced Law Enforcement Response Technology
- **Texas Workforce Commission (TWC).** TELE-SERV Interactive Voice Response System
- **The Aarell Company.** Domestic Violence Documentation System
- **The National Academy Press.** The Virtual Reading Room and Bookstore
- **U.K. Employment Service.** Labour Market System (LMS)
- **U.S. Army Center of Military History.** U.S. Army Gulf War Declassification Project
- **U.S. Bureau of Census.** Integrated Microcomputer Processing System-IMPS
- **U.S. Customs Service, Office of Information Technology.** Automated Export System (AES)
- **U.S. Defense Intelligence Agency.** COLISEUM (Community On-line Intelligence System for End-Users and Managers)
- **U.S. Postal Service.** JAVA Postage Statements
- **United Nations.** Integrated Management Information Systems (IMIS)
- **United Network.** Organ Sharing (UNOS). The UNOS network
- **United Way of Massachusetts Bay.** Web site
- **World Vision.** Donor Matching

MANUFACTURING

- **Aspen Technology, Inc.** 1stQuality Real-Time Manufacturing Quality System
- **Bay Networks, Inc.** BayFAST (Bay Networks Future Applications, Systems, & Technology)
- **Boeing Commercial Airplane Group.** Define and Control Airplane Configuration /Manufacturing Resource Management (DCAC/MRM)
- **Buckman Laboratories, Inc.** Knowledge Sharing
- **Case Corporation.** CaseWarr
- **Data Works Corporation.** ERP Systems for Mid-Range Manufacturers
- **Deere & Company.** Algorithm Based Scheduling Optimization
- **Ford Motor Company.** Correlation Engineering Application
- **Fruit of the Loom.** Activewear Online
- **General Motors Corporation.** GM ACCESS
- **Iona Appliances, Inc.** Iona Appliances Inc. SAP R/3 Implementation
- **LTV Steel - Cleveland District.** Rapid Access of Data for Decision Support (RADDS)
- **Lyondell Petrochemical.** Becoming The Paperless Office
- **Owens-Corning.** Enterprise-wide information system implementation
- **Rover Group Ltd.** DISCUS
- **Sidmar.** Amber (Automated Inventory System)
- **Storage Dimensions.** TechConnect
- **The Coleman Company, Inc.** On Line SPC
- **Timken Company.** Activity Based Management Information System
- **WOMEX.** WOMEX Online

MEDIA, ARTS AND ENTERTAINMENT

- **Against All Odds Productions (AAO).** 24 Hours in CyberSpace
- **Bloomberg Financial Systems.** The Bloomberg Terminal
- **Chyron Corporation.** INFINIT! Corporation
- **CitySearch, Inc.** CitySearch
- **Color Monster Fine Art Publishing.** The Fine Art History of Notre Dame Football
- **Houghton Mifflin Company.** Financial Reengineering & System Implementation
- **ICon CMT Corp.** IConWorks
- **McCarter Theatre Center.** The Performing Arts. ArtsWeb
- **Micro Systems Software.** Cyber Patrol
- **N2K Inc.** N2K Entertainment Music Web Sites
- **PictureTel Corporation.** SwiftSite Videoconferencing System
- **Rock the Vote.** 1-800-REGISTER
- **San Francisco 49ers.** SF 49ers & SF Giants Internet Kiosks
- **The Getty Center.** ArtsEdNet
- **Time, Inc.** Digitized Photo Library

MEDICINE

- **Aetna U.S. Healthcare.** HDIC
- **Alexandria Hospital.** Heart Health Assessment
- **American Medical Association.** AMA Web Site
- **Art Research Institute.** Visual Therapy
- **Avicenna Systems Corporation.** Avicenna IntraNets and Medical Information Supersite
- **Baxter Healthcare.** Renal Link
- **BioNumerik Pharmaceuticals, Inc.** Pharmaceutical Development Through Supercomputing
- **Bowman Gray/Baptist Hospital Medical Center.** Medical Center Data Repository
- **Cambridge Heart, Inc.** CH 2000 Cardiac Diagnostic System
- **Centra Health Systems.** The Centra Health Decision Support System
- **Coulter Corporation.** Interlaboratory Quality Assurance Program (IQAP)
- **CYTYC Corporation.** Thin Prep 2000 Processor
- **Department of Veterans Affairs.** Wireless Medical Information System (WMIS)
- **Erisco.** Facets
- **Foundation Health Systems, Inc.** 4th Generation Medical Management
- **HBO and Company.** Healthquest 2000
- **HCIA HealthChex.** CCI Methodology - Peer-A-Med
- **Henry Ford Health Systems.** Medical Information Management System
- **Hershey Medical Center - Penn State University.** Robotically-Assisted Microsurgery System for Endoscopic Cardiac Surgery
- **Integrated Communications Server (SCRIBE: serveur de communications intégrées).** Regional Medical Imagery Network
- **INTEGRIS Health.** INTEGRIS Health's Second Long Range Information Systems Plan
- **InterMountain Health Care.** Quality Care Tracking Project
- **John Deere Health Care, Inc.** Decision Support System for Rural Healthcare
- **Joslin Diabetes Center.** Joslin Vision Network
- **Kaiser Permanente (Rocky Mtn. Division).** Clinical Information System
- **Kaiser Permanente Southern California.** GBAR Billing Statement Project
- **Memorial Sloan-Kettering Cancer Center.** Disease Management System (DMS)
- **MiniMed.** Artificial Pancreas
- **Montefiore Medical Center.** IIS Healthcare Automation: Paperless Purchasing & Inventory
- **Mythical Intelligence.** Attention Deficit Disorder Forum on CompuServe
- **National Committee for Quality Assurance (NCQA).** Quality Compass
- **Neoprobe Corporation.** Cancer Testing (RIGS) Surgical Cancer Detection System
- **Paragon Managed Care Systems.** C/s HealthTrek
- **Quest Diagnostics, Incorporated.** Quest Informatics
- **Raytel Medical Corporation.** The Patient Management Database
- **RTI.** RTI Medical System
- **Rush University/Rush-Presbyterian-St. Luke's Medical Center.** The RushNET Information Network
- **Saint Joseph's Hospital of Atlanta.** Enterprise Wide Networking and Data Integration
- **Sarasota Memorial Hospital.** E-CABG
- **Schick Technologies, Inc.** Schick CDR (Computed Dental Radiography)
- **Sentara Health System.** Clinical Care Improvement Using Artificial Intelligence Assisted Disease Analysis
- **St. John Medical Center.** Computerized Electronic Medical Record (EMR) Application
- **St. Vincent's Hospital.** Enabling technologies in healthcare
- **STARBRIGHT Foundation.** STARBRIGHT World
- **The Cleveland Clinic Foundation.** Robotic assisted Endoscopic Coronary Artery Bypass Graft (RE-CABG)
- **U.S. Quality Algorithms, Inc.** Health Profile Database Project
- **UCLA, School of Medicine for Electronic Infrastructure.** Computerized Medicine (EpIC Med)
- **United States Environmental Protection Agency.** Supercomputer Simulations of the Human Lung
- **Westerviks Hospital.** Hybrid Film/CD Imaging System
- **Yale University School of Medicine, Department of Surgery.** Operation Outreach

SCIENCE

- **Coulter Corporation.** Remote Communications System
- **Department of Radiology, Johns Hopkins Hospital.** The [illegible] Maiden
- **Incyte Pharmaceuticals, Inc.** Bioinformatics
- **National Center for Supercomputing Applications.** Bioinformatics Workbench
- **North Carolina State University.** Supercomputer Simulations of Materials
- **San Diego Supercomputer Center/UC Santa Cruz.** Colliding Galaxies Simulation
- **The Center for Analysis and Prediction of Storms & Pittsburgh Supercomputing Center.** Severe Storm Forecasting
- **The National Center for Supercomputing Applications.** MOSAIC
- **The Scripps Research Institute & Pittsburgh Supercomputing Center.** Simulation of Protein Folding
- **The University of California San Francisco, The National Institute of Environmental Health Science & Pittsburgh Supercomputing Center.** DNA Simulation
- **Woods Hole Oceanographic Institute.** Global mapping of ocean floor

TRANSPORTATION

- **Air Canada.** The Aeroplan Customer Management System
- **Companía Vale Do Rio Doce (CVRD).** Railroad and Harbor Control System
- **Daimler-Benz, AG, Dept. FIM/FF.** Driving Simulator
- **Federal Express Corporation (FEDEX).** Air Bill Tracking System
- **FHWA/NHTSA National Crash Analysis Center at The George Washington University.** Computer modeling of crashes for improved transportation safety
- **Hongkong International Terminals Limited.** Productivity Plus Program (3P)
- **Military Sealift Command (MSC).** IC3
- **Roadway Express, Inc.** Roadway Express Online
- **Safmarine Computer Services (Pty) Ltd.** QUAY
- **TAM Transportes Aereos Regionais S/A.** Paperless Check-in

The Chairmen's Committee

Eric A. Benhamou, *3Com Corporation*
Ronald Chwang, *Acer America Corporation*
John Warnock, *Adobe Systems, Inc.*
John C. Lewis, *Amdahl Corporation*
Steve Case, *America Online, Inc.*
Richard Notebaert, *Ameritech*
George T. Shaheen, *Andersen Consulting LLP*
Gilbert Amelio, *Apple Computer, Inc.*
[illegible], *Arthur D. Little, Inc.*
Peter Taylor, *Ascom Timeplex*
Robert E. Allen, *AT&T*
[illegible], *Auspex Systems Incorporated*
David House, *Bay Networks, Inc.*
George H. Conrades, *BBN Corporation*
Raymond W. Smith, *Bell Atlantic Corporation*
George H. Heilmeier, *Bellcore*
John L. Clendenin, *BellSouth Corporation*
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William Stasior, *Booz·Allen & Hamilton, Inc.*
Donald Zereski, *Bull HN Information Systems Inc.*
[illegible], *Candle Corporation*
Thomas M. Nies, *Cincom Systems, Inc.*
[illegible]
Eckhard Pfeiffer, *Compaq Computer Corporation*
[illegible], *CompuServe*
Charles B. Wang, *Computer Associates, Inc.*
Gene Wang, *Computer Motion, Inc.*
Michael R. Rogers, *Computerworld, Inc.*
Peter Karmanos, Jr., *Compuware Corporation*
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Ted Smith, *FileNet Corporation*
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Marvin L. Mann, *Lexmark International, Inc.*
[illegible], *Lockheed Martin IMS*
Michael Zisman, *Lotus Development Corporation*
Robert Madge, *Madge Networks, Inc.*
Bert C. Roberts, Jr., *MCI Telecommunications Corp.*
William H. Gates, *Microsoft Corporation*
Merritt Lutz, *Morgan Stanley & Co. Incorporated*
Gary Tooker, *Motorola Inc.*
Kenjiro Nitta, *NEC Technologies, Inc.*
Robert L. Poette, *NetFRAME Systems Incorporated*
James L. Barksdale, *Netscape Communications Corp.*
Steven P. Jobs, *NeXT Software, Inc.*
Jean C. Monty, *Northern Telecom*
Eric Schmidt, *Novell, Inc.*
Ivan Seidenberg, *NYNEX Corporation*
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Benny Alagem, *Packard Bell NEC, Inc.*
Timothy J. Cullen, *Panasonic Communications & Systems Co.*
Norman E. Gaut, *PictureTel Corporation*
Andrew Filipowski, *PLATINUM technology, inc.*
[illegible], *Price Waterhouse*
Christopher Erickson, *Red Brick Systems, Inc.*
J.R. Beyster, *SAIC*
Paul Wahl, *SAP America, Inc.*
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Karl Geng, *Siemens Business Communication Systems, Inc.*
Edward McCracken, *Silicon Graphics/Cray Research*
Robert H. Ewald, *Silicon Graphics/Cray Research*
[illegible], *Software AG Americas, Inc.*
[illegible], *Software Engineering of America*
Edward E. Whitacre, Jr., *Southwestern Bell Corp.*
William T. Esrey, *Sprint*
Sterling Williams, *Sterling Software, Inc.*
David Weiss, *Storage Technology Corporation*
William E. Foster, *Stratus Computer, Inc.*
Scott G. McNealy, *Sun Microsystems, Inc.*
[illegible], *Sybase, Inc.*
[illegible], *Symantec Corporation*
[illegible], *Tandem Computers Incorporated*
[illegible], *Technology Solutions Company*
[illegible], *Texas Instruments Software*
[illegible], *Toshiba America Information Systems, Inc.*
Casey Cowell, *U.S. Robotics Access Corp.*
James A. Unruh, *Unisys Corporation*
Richard D. McCormick, *US West, Inc.*
Joseph M. Tucci, *Wang Laboratories, Inc.*
Morris Chang, *Wyse Technology*
Paul Allaire, *Xerox Corporation*

The 1997 Collection

Finalists are noted in red.

BUSINESS AND RELATED SERVICES

- **ADP News Partner.** Investment Software Systems, ADP, Inc.
- **American Century Investments.** On Line Account Access
- **AT&T Result Management Group.** Results Management Information Network (RMIN)
- **AutoNation.** AutoCade
- **BEA Systems, Inc.** BEA Enterprise Transaction Framework
- **Bell Atlantic.** SaleService Negotiation System (SSNS)
- **Bell Atlantic InfoSpeed.** InfoSpeed
- **Bell Sygma Inc.** Total Information Access System (TIAS II)
- **Brooktrout Technology, Inc.** Brooktrout TR114 Series
- Cisco Systems. Cisco Global Networked Business Model
- **Compaq Computer Corporation.** TOPS (Total Order Planning System)
- **Corporate Customer Business Unit, Telkom South Africa.** Customer Empowerment Infrastructure
- **CyberSlice, Inc.** CyberSlice
- **Dr. Pepper/Seven Up, Inc.** Decision Support System
- **Florida Power Company.** Customer Service System
- GE Medical Systems. InSite
- **Globalstar.** Globalstar
- **Hallmark Cards, Inc.** Enterprise Network
- **Hill's Pet Nutrition, Inc.** Partners
- **Hitachi Semiconductor (M) Sdn Bhd.** IMPACT - An Integrated Workflow System
- **Infocamere S.C.P.A. - Padua - Italy.** IMAGING
- **Lowe's Companies.** MIS Help Desk Vendor Escalation
- **Magic Solutions Inc.** SupportMagic
- **Manpower Inc.** PowerBase
- **Mas-Hamilton Group.** Cencon System 2000 & X-07
- **MCI Telecommunications.** MCIOne
- **MCI Telecommunications/Enterprise Systems Management.** Distributed Systems Management
- Merck & Company, Inc. Procurement Re-engineering Project
- **Ministère de l'Industrie.** BAE - Bourse d'Affaires Electronique
- **NETCOM.** NETCruiser
- **Network Solutions, Inc.** Internet Network Information Center
- **New Brunswick Telephone (NBTel).** Infocosm Phone Store
- **Nobody Beats the Wiz.** The WIZ Interactive Shopping Experience (WISE)
- **Pacific Telesis Group.** TELSTAR (TELesis STrategic Application Replacement) Project
- **QUALCOMM Incorporated.** Code Division Multiple Access (CDMA)
- **Reltec.** Totally Integrated Enterprise (TIE)
- **Southern California Edison.** Technology Standards
- **SPSS Inc.** Pivot Tables
- **T.D. Brown, Inc.** Seniors 2000/Advanced Digital Imaging
- Texas Instruments. Innovation Website Team TI Tomorrow
- Texas Instruments – Office of Best Practices. Best Practice Sharing
- **The Dow Chemical Company.** Diamond Services
- **The Good Guys! Dream Stream:** The implementation of HR Stream
- The Johns Hopkins Health System & The John Hopkins Medicine Center. Information Services for The Johns Hopkins Electronic Patient Record
- **The Sharper Image Corp.** WebObjects online catalog system
- United Parcel Service (UPS). Networking into the Millenium
- **United Parcel Service (UPS).** The Information Library
- **United Services Automobile Association (USAA).** Database Management Reorganization Project
- **VeriFone, Inc.** Low Cost Credit Card Authorization Terminals
- **Victoria's Secret Stores.** Data warehouse!
- **Visioneer, Inc.** Paperport
- **Wal-Mart.** Inventory Management
- **Yarra Valley Water Ltd.** Easy Access and Propertyflow image and data retrieval system

EDUCATION AND ACADEMIA

- **Abita Springs Elementary School.** Hypertext Folklife Curriculum Project
- **Ames Laboratory.** Undergraduate Computational Engineering and Science Project (UCES)
- **Aptex Software Inc.** VITAL ResourceMiner
- **Arizona State University.** ASU Data Warehouse/Class Roster Reporting System
- **Babson College.** ViDi-O Enabled - View It and Do It Online
- **Board of Regents of the University System of the Georgia Office of Information and Instructional Technology.** Galileo Project
- **Canadian Museum of Civilization.** New Media Infrastructure
- **Chipeta Elementary School.** The CHIPETA/MCI Alliance
- **Collier-Sierra.** Multimedia Encyclopedia
- **Computelec Australia.** The Student Notebook Access Program (SNAP)
- **Computer Curriculum Corp.** Educational Software Solutions
- **Desert Sands Unified School District.** Microwave Metropolitan Area Network
- **Drakensberg Boys' Choir School.** Music Technology Instruction in the Classroom
- **Eastman School of Music, University of Rochester for Multimedia Programming.** Music Instruction
- **Genentech, Inc.** Access Excellence: Helping America's Biology Teachers Make the Grade
- **Greene County Technology Consortium.** Greene County Education Initiative
- **Hacienda La Puente Unified School District.** HLPnet Community Learning Network
- **Harris County School System.** Elementary Large Distributive Network
- **Harvard University, Graduate School of Business Administration.** Harvard Business School Intranet
- **Infonautics Corp.** Electric Library(TM)
- Jet Propulsion Laboratory. Virtual
- **Kansas City, Missouri School District.** Wide-Area Digital Network
- **Memorial University of Newfoundland.** Virtual Campus
- **Metro Educational Cooperative Service Unit for Envision It! Computational Science.** Teaching & Learning
- **MnSCU/PALS.** WebPALS
- **National Geographic Society.** National Geographic Kids Network
- **Orange County Public Schools.** Museum Resource CD
- **Outdoor Online.** Internet T-1 World Wide Web
- **Partners in Education.** Towards a Winning Nation
- **Pine Ridge School.** Distance Learning-Pine Ridge School
- **Plano Texas School District.** WideDistrict Network
- **PRIDE Media.** Pride! Fights AIDS
- **Rochester City School District's Theodore Roosevelt School No. 43.** Rochester City School No. 43 Web Site
- **San Jose Unified School District.** San Jose Unified School District Technology Project
- Stanford Law School. The Securities Class Action Clearinghouse
- **Sun Microsystems.** Net Day
- Susan Abdulezer. The Virtual Alphabet Book
- **The Catlin Gabel School.** Campus-Wide Educational Network
- **The Children's Partnership.** America's Children & The Information Superhighway: Parent Involvement Project
- **The Franklin Institute Science Museum.** Science Learning Network
- **The National Council of Educational Opportunity Associations (NCEOA).** TRIO
- **University of Illinois-Administrative Information Systems.** Class Manager
- **West Virginia Department of Education.** WORLD SCHOOL PROGRAM
- **Willoughby Associates, Limited.** Multi MIMSY
- Words+. Pegasus Lite Augmentative Communication System
- Xerox Adaptive Products. The Reading Edge

ENVIRONMENT, ENERGY AND AGRICULTURE

- **Air Products & Chemicals, Inc.** ChemReg
- **Arizona Public Service Company.** Materials Logistics Information System
- **Bright Wood Corporation.** Optimizing cut plant for the lumber remanufacturing industry (Plant 11)
- British Petroleum. Virtual Teamwork
- **Consolidated Edison of New York, Inc.** Interactive Customer Communications
- Cyberlab, Inc. Computerized Robotic Workstation
- **Detroit Edison Company.** Corporate Real Estate(CRES) Imaging/ Database System
- **Jet Propulsion Laboratory/California Institute of Technology.** Linkwinds, the Linked Windows Interactive Data System
- **KN Energy, Inc.** KN's Energy Market
- **Mobil Exploration & Producing U.S. Inc.** Automated Field Systems
- **Molten Metal Technology, Inc.** Catalytic Extraction Processing (CEP)
- National Center for Atmospheric Research. Development and Use of the Climate System Model
- Niagara Mohawk Power Corporation. Nostradamus Forecasting System
- **Nuclear Document Management System, Southern California Edison.** Nuclear Document Management System (NDMS)
- **PacifiCorp.** Customer Service Systems (CSS)
- **RAPID, Inc.** PowerAg Network
- **SAIC.** STOrage and RETrieval System (STORET)
- Science Applications International Corporation (SAIC). Plasma Hearth Process (PHP)
- **Shell Malaysia Trading Sdn Bhd.** The Business Reengineering Journey
- The Peregrine Fund. The Harpy Eagle Conservation Program
- **U.S. Environmental Protection Agency(EPA)/SAIC.** Safe Drinking Water Information System (SDWIS)

FINANCE, INSURANCE AND REAL ESTATE

- **Advance Bank AG, Munich, Germany.** APOLLO-Call Center and Back-Office Solution for Building a Virtual Bank
- **American General Life & Accident Insurance Company.** SmartPad/POS System
- **American National Bank.** Mobile Solutions for Banking
- **Banc One.** TRIUMPH Integrated Correspondence System
- **BankBoston.** Retail Delivery Project
- **BlueCross BlueShield of Louisiana.** Workplace
- BlueShield of California. Health Care Insurance: Improving Access to Customer Service
- CheckFree Corporation. CheckFree E-Bill
- **Cityscape Corp.** Cityware - Loan Origination System
- **Commercial Union Insurance Companies.** Empowering Field and Agency Work Force By Client Server Technology
- Fannie Mae. MORNETPlus
- **First Data Corporation.** USA Value Exchange
- First Union National Bank. Remote Banking Service
- Flagstar Bank, FSB. LIVE (Lenders' Interactive Video Exchange)
- **General Electric Company.** Financial Foundations Course
- **General Motors Acceptance Corp.** Express Ap Processing System
- **Johnson & Higgins.** J&H RiskStrategist
- **KeyCorp.** Composite Banking
- **Komercni Banka.** Online banking
- **Nasdaq Stock Market, Inc.** Nasdaq Web Site
- **R+V Allgemeine Versicherung AG.** Integrated Decision Support System (DSS) - Profit & Loss
- **Royal Bank of Canada.** Portfolio Query System (POS)
- **Sallie Mae.** ImDoc
- **Security First Group.** Integrated Voice Response System\Loans
- **Sedgwick, Inc.** INFORM™
- **SEGA, Swiss Securities Clearing Corporation.** SECOM (SEGA COMMUNICATION SYSTEM)
- Standard Chartered Bank. Document Imaging and Workflow Technology
- **Unibanco, S.A.** Technology enabling two big banks integration

GOVERNMENT AND NONPROFIT ORGANIZATIONS

- **AAMVAnet, Inc.** Advantis
- **American Cancer Society.** Funding Analysis and Reporting System (FARE)
- **An Post (The Irish National Post Office).** CounterAction
- **Applied Network Solutions, Inc.** Kids Identification Digital Software (K.I.D.S.)
- **California Department of Health Services, Accounting Section.** CALSTARS STARGAZE
- **California Department of Motor Vehicles.** The MONARCH Project: California Department of Motor Vehicles Improves Legal Presence Verification Process
- **California Highway Patrol Information Management Division.** CHP Statewide Information Network
- **Casey Family Program.** Casey Information System(CIS)
- **Centers for Disease Control, Epidemiology Program Office.** MMRW OnLine
- **City of Escondido.** Technological Enablement of Community-Oriented Government
- **Department of Defense – Deputy Under Secretary Defense (Acquisition Reform/Electronic Commerce).** Web Technology for Central Contractor Registration (CCR)
- **Department of Education, Employment, Training and Youth Affairs.** Automated Job Selection (AJS)
- **Department of Treasury.** Treasury Communications System
- **Essex Police.** Essex Police Integrated Computer System (EPICS)
- **Federal Communications Commision (FCC) Auctions Division.** FCC Remote Electronic Auction System
- First Chicago/Mercantile Services L.L.C. Electronic Federal Tax Payment System (EFTPS)
- **Fund for the City of New York.** Midtown Community Court, Court Application
- **GGTech.** Handicapped Users' Database - IBM Special Needs Forum
- **Immigration and Naturalization Service.** Secure Electronic Network for Travelers Rapid Inspections (SENTRI)
- **Information Management Department of the Naval Air Warfare Center.** Transition to Accommodate the New Organization
- **Intelenet Commission.** ACCESS INDIANA: CONNECTING PEOPLE AND INFORMATION THROUGH TECHNOLOGY
- **KPMG Peat Marwick LLP.** Talking User Interface for Governmental Accounting Applications
- **Lake County.** Virtual Government Center Web Site
- **Los Alamos National Laboratory.** Integrated Document Exchange (INDEX) Project
- **Los Angeles Police Department.** Mayor's Alliance for a Safer Los Angeles and COPS MORE Projects
- **Maricopa County Recorder.** Recorder's Document Information System
- Massachusetts Department of Revenue. Telefile & Imaging: Revolutionary Tax Processing Systems
- **Massachusetts Registry of Motor Vehicles.** RMV Internet Initiative
- **Metropolitan Toronto Police.** METROPOLIS
- **Michigan Medical Services Administration.** Michigan Medicaid Decision Support Project
- **Ministere de la Culture (France).** Service Public d'Information sur le Patrimoine Culturel (SPIC)
- **National Center for Missing and Exploited Children.** National Center for Missing & Exploited Children's Web Site
- **National Science Foundation.** NSF FastLane Project

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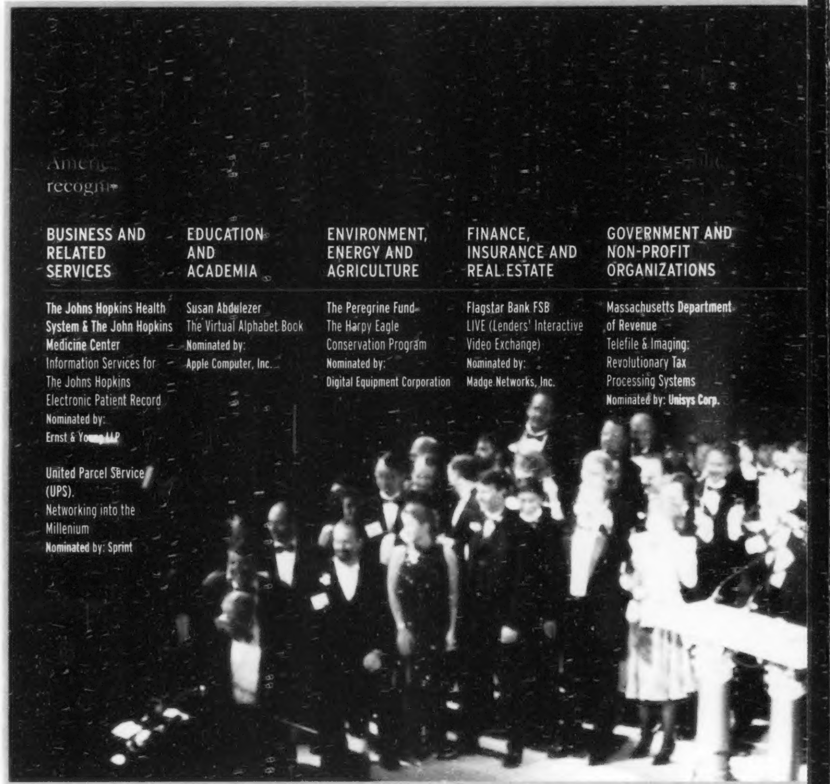
THE 1997 COMPUTERWOR



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BUSINESS AND RELATED SERVICES	EDUCATION AND ACADEMIA	ENVIRONMENT, ENERGY AND AGRICULTURE	FINANCE, INSURANCE AND REAL ESTATE	GOVERNMENT AND NON-PROFIT ORGANIZATIONS
The Johns Hopkins Health System & The John Hopkins Medicine Center Information Services for The Johns Hopkins Electronic Patient Record **Nominated by:** **Ernst & Young LLP** United Parcel Service (UPS). Networking into the Millenium **Nominated by: Sprint**	Susan Abdulezer The Virtual Alphabet Book **Nominated by:** **Apple Computer, Inc.**	The Peregrine Fund The Harpy Eagle Conservation Program **Nominated by:** **Digital Equipment Corporation**	Flagstar Bank FSB LIVE (Lenders' Interactive Video Exchange) **Nominated by:** **Madge Networks, Inc.**	Massachusetts **Department of Revenue** Telefile & Imaging: Revolutionary Tax Processing Systems **Nominated by: Unisys Corp.**

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LD SMITHSONIAN AWARDS

MANUFACTURING	MEDIA, ARTS AND ENTERTAINMENT	MEDICINE	SCIENCE	TRANSPORTATION
Buckman Laboratories, Inc. Knowledge Sharing Nominated by: Ernst & Young LLP	Rock the Vote 1-800-REGISTER Nominated by: MCI Telecommunications Corporation	InterMountain Health Care Quality Care Tracking Project Nominated by: NeXT Software, Inc. United States Environmental Protection Agency Supercomputer Simulations of the Human Lung Nominated by: Silicon Graphics/Cray Research	The Center for Analysis and Prediction of Storms & Pittsburgh Supercomputing Center Severe Storm Forecasting Nominated by: Silicon Graphics/Cray Research	Hongkong International Terminals Limited Productivity Plus Program (3P) Nominated by: Hewlett-Packard Company

THE COMPUTERWORLD SMITHSONIAN AWARDS

June 9, 1997 • Washington, D.C.

- **NAVIDEC Inc. for Integrated Visitor Information System of Colorado.** The Colorado Outdoor Recreation Resource Project
- **New York City Department of Information Technology and Telecommunications (DoITT).** Tow Eligibility Interrogation Terminal (TowIT)
- **Norand Corporation.** PEN* Key 6300 Hand Held Terminal
- **NOVA Private Industry Council.** Youth@Work
- Office of Defense Programs, U.S. Department of Energy. Accelerated Strategic Computing Initiative (ASCI)
- **Pennsylvania State Police.** Development of Enterprise-wide Information Technology
- **Pension Benefit Guaranty Corp.** Premium Accounting System
- **Philippines' Social Security System (SSS).** Executive Information System (EIS)
- Plugged In. Plugged In – Bridging the Technological Gap
- **Politie Midden en West Brabant.** Five minutes before 12 or Project 11th hour
- **Rome Laboratory.** Cronus/Corbus Distributed Computing Environment
- **SEMI (Semiconductor Equipment and Materials International).** SEMI OnLine
- **Spanish General Treasury of Social Security.** Spanish Social Security Smart Card
- **State of California, Franchise Tax Board.** Collection Account Processing System (CAPS)
- **State of Georgia Environmental Protection Division of the Department of Natural Resources.** Enhanced Emmission Inspection and Maintenance Program
- **State of Oregon Dept. of Human Resources.** Oregon TRACS (Transition, Referral, and Client Self-sufficiency)
- **Swedish National Police Board.** MoAi
- **Telkom SA Ltd.** Impendulo
- **Texas Department of Health.** TexMedNet
- **Texas Department of Protective and Regulatory Services.** CAPS (Child and Adult Protective System)
- **Texas Transportation Institute & U.S. Department of Transportation.** ALERT - Advanced Law Enforcement Response Technology
- **Texas Workforce Commission (TWC).** TELE-SERV Interactive Voice Response System
- The Aarell Company. Domestic Violence Documentation System
- **The National Academy Press.** The Virtual Reading Room and Bookstore
- **U.K. Employment Service.** Labour Market System (LMS)
- **U.S. Army Center of Military History.** U.S. Army Gulf War Declassification Project
- **U.S. Bureau of Census.** Integrated Microcomputer Processing System-IMPS
- **U.S. Customs Service, Office of Information Technology.** Automated Export System (AES)
- **U.S. Defense Intelligence Agency.** COLISEUM (Community On-line Intelligence System for End-Users and Managers)
- **U.S. Postal Service.** JAVA Postage Statements
- **United Nations.** Integrated Management Information Systems (IMIS)
- **United Network.** Organ Sharing (UNOS). The UNOS network
- **United Way of Massachusetts Bay.** Web site
- **World Vision.** Donor Matching

MANUFACTURING

- **Aspen Technology, Inc.** 1stQuality Real-Time Manufacturing Quality System
- Bay Networks, Inc. BayFAST (Bay Networks Future Applications, Systems & Technology)
- Boeing Commercial Airplane Group. Define and Control Airplane Configuration/Manufacturing Resource Management (DCAC/MRM)
- Buckman Laboratories, Inc. Knowledge Sharing
- **Case Corporation.** CaseWarr
- **Data Works Corporation.** ERP Systems for Mid-Range Manufacturers
- **Deere & Company.** Algorithm Based Scheduling Optimization
- **Ford Motor Company.** Correlation Engineering Application
- Fruit of the Loom. Activewear Online
- **General Motors Corporation.** GM ACCESS
- **Iona Appliances, Inc.** Iona Appliances Inc. SAP R/3 Implementation
- **LTV Steel - Cleveland District.** Rapid Access of Data for Decision Support (RADDS)
- **Lyondell Petrochemical.** Becoming The Paperless Office
- **Owens-Corning.** Enterprise-wide information system implementation
- **Rover Group Ltd.** DiSCUS
- **Sidmar.** Amber (Automated Inventory System)
- **Storage Dimensions.** TechConnect
- **The Coleman Company, Inc.** On Line SPC
- **Timken Company.** Activity Based Management Information System
- WOMEX. WOMEX Online

MEDIA, ARTS AND ENTERTAINMENT

- Against All Odds Productions (AAO). 24 Hours in CyberSpace
- **Bloomberg Financial Systems.** The Bloomberg Terminal
- **Chyron Corporation.** iNFINiT! Corporation
- CitySearch, Inc. CitySearch
- **Color Monster Fine Art Publishing.** The Fine Art History of Notre Dame Football
- **Houghton Mifflin Company.** Financial Reengineering & System Implementation
- **ICon CMT Corp.** IConWorks
- **McCarter Theatre Center.** The Performing Arts. ArtsWeb
- **Micro Systems Software.** Cyber Patrol
- **N2K Inc.** N2K Entertainment Music Web Sites
- **PictureTel Corporation.** SwiftSite Videoconferencing System
- Rock the Vote. 1-800-REGISTER
- **San Francisco 49ers.** SF 49ers & SF Giants Internet Kiosks
- The Getty Center. ArtsEdNet
- Time, Inc. Digitized Photo Library

MEDICINE

- **Aetna U.S. Healthcare.** HDIC
- **Alexandria Hospital.** Heart Health Assessment
- **American Medical Association.** AMA Web Site
- **Art Research Institute.** Visual Therapy
- **Avicenna Systems Corporation.** Avicenna IntraNets and Medical Information Supersite
- **Baxter Healthcare.** Renal Link
- BioNumerik Pharmaceuticals, Inc. Pharmaceutical Development Through Supercomputing
- **Bowman Gray/Baptist Hospital Medical Center.** Medical Center Data Repository
- **Cambridge Heart, Inc.** CH 2000 Cardiac Diagnostic System
- **Centra Health Systems.** The Centra Health Decision Support System
- **Coulter Corporation.** Interlaboratory Quality Assurance Program (IQAP)
- **CYTYC Corporation.** Thin Prep 2000 Processor
- **Department of Veterans Affairs.** Wireless Medical Information System (WMIS)
- **Erisco.** Facets
- Foundation Health Systems, Inc. 4th Generation Medical Management
- **HBO and Company.** Healthquest 2000
- **HCIA HealthChex.** CCI Methodology - Peer-A-Med
- **Henry Ford Health Systems.** Medical Information Management System
- **Hershey Medical Center - Penn State University.** Robotically-Assisted Microsurgery System for Endoscopic Cardiac Surgery
- **Integrated Communications Server (SCIRRIM: serveur de communications integrees).** Regional Medical Imagery Network
- **INTEGRIS Health.** INTEGRIS Health's Second Long Range Information Systems Plan
- InterMountain Health Care. Quality Care Tracking Project
- **John Deere Health Care, Inc.** Decision Support System for Rural Healthcare
- **Joslin Diabetes Center.** Joslin Vision Network
- **Kaiser Permanente (Rocky Mtn. Division).** Clinical Information System
- **Kaiser Permanente Southern California.** GBAR Billing Statement Project
- **Memorial Sloan-Kettering Cancer Center.** Disease Management System (DMS)
- **MiniMed.** Artificial Pancreas
- **Montefiore Medical Center.** US Healthcare Automation: Paperless Purchasing & Inventory
- **Mythical Intelligence.** Attention Deficit Disorder Forum on CompuServe
- **National Committee for Quality Assurance (NCQA).** Quality Compass
- **Neoprobe Corporation.** Cancer Testing (RIGS) Surgical Cancer Detection System
- **Paragon Managed Care Systems.** C/s HealthTrek
- **Quest Diagnostics, Incorporated.** Quest Informatics
- **Raytel Medical Corporation.** The Patient Management Database
- **RTI.** RTI Medical System
- **Rush University/Rush-Presbyterian-St. Luke's Medical Center.** The RushNET Information Network
- **Saint Joseph's Hospital of Atlanta.** Enterprise Wide Networking and Data Integration
- **Sarasota Memorial Hospital.** E-CABG
- **Schick Technologies, Inc.** Schick CDR (Computed Dental Radiography)
- **Sentara Health System.** Clinical Care Improvement Using Artificial Intelligence Assisted Disease Analysis
- **St. John Medical Center.** Computerized Electronic Medical Record (EMR) Application
- **St. Vincent's Hospital.** Enabling technologies in healthcare
- STARBRIGHT Foundation. STARBRIGHT World
- **The Cleveland Clinic Foundation.** Robotic assisted Endoscopic Coronary Artery Bypass Graft (RE-CABG)
- **U.S. Quality Algorithms, Inc.** Health Profile Database Project
- **UCLA, School of Medicine for Electronic Infrastructure.** Computerized Medicine (EpIC Med)
- United States Environmental Protection Agency. Supercomputer Simulations of the Human Lung
- **Westerviks Hospital.** Hybrid Film/CD Imaging System
- **Yale University School of Medicine, Department of Surgery.** Operation Outreach

SCIENCE

- **Coulter Corporation.** Remote Communications System
- **Department of Radiology, Johns Hopkins Hospital.** The Ampato Maiden
- **Incyte Pharmaceuticals, Inc.** Bioinformatics
- **National Center for Supercomputing Applications.** Bioinformatics Workbench
- North Carolina State University. Supercomputer Simulations of Materials
- **San Diego Supercomputer Center/UC Santa Cruz.** Colliding Galaxies Simulation
- The Center for Analysis and Prediction of Storms & Pittsburgh Supercomputing Center. Severe Storm Forecasting
- The National Center for Supercomputing Applications. MOSAIC
- The Scripps Research Institute & Pittsburgh Supercomputing Center. Simulation of Protein Folding
- The University of California San Francisco, The National Institute of Environmental Health Science & Pittsburgh Supercomputing Center. DNA Simulation
- **Woods Hole Oceanographic Institute.** Global mapping of ocean floor

TRANSPORTATION

- **Air Canada.** The Aeroplan Customer Management System
- Compania Vale Do Rio Doce (CVRD). Railroad and Harbor Control System
- Daimler-Benz, AG. Dept. FIM/FF. Driving Simulator
- Federal Express Corporation (FEDEX). Air Bill Tracking System
- FHWA/NHTSA National Crash Analysis Center at The George Washington University. Computer modeling of crashes for improved transportation safety
- Hongkong International Terminals Limited. Productivity Plus Program (3P)
- **Military Sealift Command (MSC).** IC3
- **Roadway Express, Inc.** Roadway Express Online
- **Safmarine Computer Services (Pty) Ltd.** QUAY
- TAM Transportes Aereos Regionais S/A. Paperless Check-in

The Chairmen's Committee

Eric A. Benhamou, *3Com Corporation*
Ronald Chwang, *Acer America Corporation*
John Warnock, *Adobe Systems, Inc.*
John C. Lewis, *Amdahl Corporation*
Steve Case, *America Online, Inc.*
Richard Notebaert, *Ameritech*
George T. Shaheen, *Andersen Consulting LLP*
Gilbert Amelio, *Apple Computer, Inc.*
Bruce Frant, *Arthur D. Little, Inc.*
Peter Taylor, *Ascom Timeplex*
Robert E. Allen, *AT&T*
William Ferry, *Banyan Systems Incorporated*
David House, *Bay Networks, Inc.*
George H. Conrades, *BBN Corporation*
Raymond W. Smith, *Bell Atlantic Corporation*
George H. Heilmeier, *Bellcore*
John L. Clendenin, *BellSouth Corporation*
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William Stasior, *Booz-Allen & Hamilton, Inc.*
Donald Zereski, *Bull HN Information Systems Inc.*
Bob LaBant, *Candle Corporation*
Thomas M. Nies, *Cincom Systems, Inc.*
John Slevin, *Comdisco, Inc.*
Eckhard Pfeiffer, *Compaq Computer Corporation*
Frank Salizzoni, *CompuServe*
Charles B. Wang, *Computer Associates, Inc.*
Gene Wang, *Computer Motion, Inc.*
Michael R. Rogers, *Computerworld, Inc.*
Peter Karmanos, Jr., *Compuware Corporation*
Ellen Knapp, *Coopers & Lybrand L.L.P.*
Ronald Skates, *Data General Corporation*
Michael Dell, *Dell Computer Corporation*
Stephen Sprinkle, *Deloitte & Touche LLP*
Robert W. Mahoney, *Diebold, Incorporated*
Robert B. Palmer, *Digital Equipment Corporation*
George M. Fisher, *Eastman Kodak Company*
Les Alberthal, *EDS*
Richard J. Egan, *EMC Corporation*
Norio Niwa, *Epson America, Inc.*
David Shpilberg, *Ernst & Young LLP*
James R. Oyler, *Evans & Sutherland*
Patrick C. Condo, *Excalibur Technologies*
Ted Smith, *FileNet Corporation*
Bill Nelson, *Geac Smartstream*
Dennis Hayes, *Hayes Microcomputer Products, Inc.*
Lewis E. Platt, *Hewlett-Packard Company*
Steve West, *Hitachi Data Systems*
Jack A. Shaw, *Hughes Network Systems, Inc.*
Louis Gerstner, *IBM Corporation*
Gerald D. Cohen, *Information Builders, Inc.*
Philip E. White, *Informix Software*
Craig R. Barrett, *Intel Corporation*
Patrick J. McGovern, *International Data Group*
Rodger Cerrtelli, *KPMG Peat Marwick LLP*
Raymond C. Kurzweil, *Kurzweil Applied Intelligence*
Marvin L. Mann, *Lexmark International, Inc.*
John Brophy, *Lockheed Martin IMS*
Michael Zisman, *Lotus Development Corporation*
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Salvatore Simeone, *Software Engineering of America*
Edward E. Whitacre, Jr., *Southwestern Bell Corp.*
William T. Esrey, *Sprint*
Sterling Williams, *Sterling Software, Inc.*
David Weiss, *Storage Technology Corporation*
William E. Foster, *Stratus Computer, Inc.*
Scott G. McNealy, *Sun Microsystems, Inc.*
Mitchell Kertzman, *Sybase, Inc.*
Gordon Eubanks, *Symantec Corporation*
Roel Pieper, *Tandem Computers Incorporated*
John Kohler, *Technology Solutions Company*
J.R. McLendon, *Texas Instruments Software*
Shunio Yatsunami, *Toshiba America Information Systems, Inc.*
Casey Cowell, *U.S. Robotics Access Corp.*
James A. Unruh, *Unisys Corporation*
Richard D. McCormick, *US West, Inc.*
Joseph M. Tucci, *Wang Laboratories, Inc.*
Morris Chang, *Wyse Technology*
Paul Allaire, *Xerox Corporation*

PowerEdge 4100/200

Dell Computer Corp.
Austin, Texas /(800) 432-2789
www.dell.com
$14,546

When describing the internal structure of Dell's PowerEdge 4100/200, our lead hardware technician wrote simply, "Room for a game of Frisbee — best of the bunch."

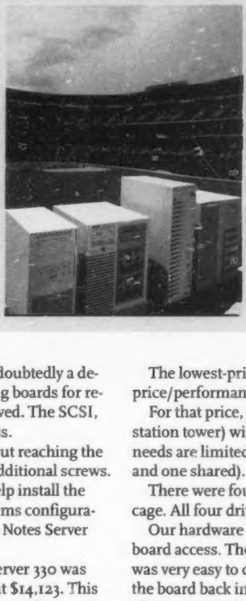
This substantial system has three Extended Industry Standard Architecture (EISA) and five PCI slots on a large, vertical system board. The chassis features more than enough room to accommodate the most ham-handed of technicians. In a nice touch, the ribbon cables are marked with highly visible legends that indicate which end connects to which device, including the SCSI cable from the dual channel PCI Ultra SCSI-2 controller to the six-drive array. The hot-swappable drives in the array can be mounted and dismounted from the front with key/lock access control, but the locking mechanism didn't feel particularly substantial.

Included with the system are a "Server Assistant" CD-ROM, which provides system utilities, diagnostics, drivers and documentation; and a copy of Intel's LANDesk Server Manager for advanced systems administration. With Dell's asking price of $14,546 for the configuration we tested, and an IntraMark1 score of 1,449 at 360 clients, the PowerEdge 4100/200 earned a creditable price/performance factor of 279 points. It didn't quite match HP's numbers, but Dell's overall performance is close, and it posted better DSS and OLTP results under the high client loads.

PRODUCT REVIEWS

Double play!

CONTINUED FROM PAGE 88



NetServer LH Pro

Hewlett-Packard Co.
Palo Alto, Calif. /(800) 322-4772
hp.com/go/netserver
$15,560

Hewlett-Packard's NetServer LH Pro was the most costly server we tested. But HP has never been known for playing the "low ball" price game, and some of the reasons for the cost soon become apparent when we examined the hardware.

Besides its physically imposing design reminiscent of much larger systems, the NetServer LH Pro boasts features such as dual power supplies (as did the Dell machine), dual-integrated PCI fast/wide SCSI bus and six front-mounted, hot-swappable drives in an array that supports RAID Levels 0, 1, 5 and 6.

Our hardware technicians were impressed by the thumbscrew assembly, combined with the presence of a case lock on the back and a drive lock on the disk array.

Attention to detail showed when we opened the case and found both a diagnostic disk and spare SCSI cable mounted to the frame. Also, each hot-swappable drive bears a label with the Web address where users can find support and configuration information.

On the software side, the LH Pro comes with a bootable CD-ROM called the HP NetServer Navigator. It provides configuration, optimization utilities and a copy of HP OpenView for Windows.

The LH Pro turned in the highest IntraMark1 score in the comparison, with 1,491 at 360 clients. It still reflects its higher cost, garnering a price/performance factor of 298.

Even so, larger shops may want to opt for HP's higher numbers.

PC Server 330

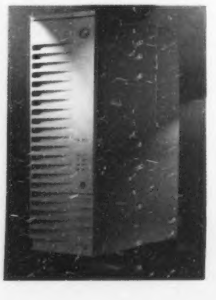
IBM PC Co.
Raleigh, N.C. /(800) 772-2227
www.pc.ibm.com/servers
$14,123

The IBM PC Server 330 is a solidly built system with few frills and good expansion potential. Like NEC's system, it was configured more like a large tower system than a traditional server.

Providing eight expansion slots (three EISA and five combined EISA/PCI) along with 10 drive bays in this size package was undoubtedly a design challenge. Unfortunately, there is some awkwardness in accessing boards for repair work even after the case and its six thumbscrews have been removed. The SCSI, power cables and a plastic shield across the power supply hinder access.

The five drives in the main bay on our test unit were easy to get to, but reaching the sixth drive required removal of an internal subframe held by several additional screws.

The system comes with a Server Guide CD (which can be used to help install the network software) and IBM's NetFinity software, which provides systems configuration and management support. IBM also includes a free copy of Lotus Notes Server Version 4.1.



Of the systems we tested, the PC Server 330 was the third most expensive, coming in at $14,123. This price, combined with the fact that it was able to support only 240 virtual clients in our test, gave it a price/performance factor of 509, by far the highest of the group.

The most striking element of the 330's performance was the sharp fall-off in its ability to handle basic HTML and image requests as the client load increased.

At 240 simulated clients, its database response remained comparable to the others. But its HTML and image response fell dramatically, dipping so far that it was lower than any of the other systems, even at the higher level of 360 clients.

Express5800

NEC Computer Systems Division
Boxboro, Mass. /(800) 709-3434
www.nec-computers.com
$9,656

Despite the fact that the Express5800 from NEC was the only system configured with just 256K bytes of on-chip cache (a 512K-byte model is available), it still turned in respectable performance figures. Its IntraMark1 score was 1,141 at 360 clients.

The lowest-priced system in the group, at less than $10,000, it earned the best price/performance factor of 236 points.

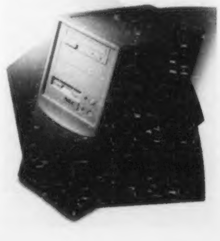
For that price, the buyer gets a comparatively small server (more the size of a workstation tower) with only moderate expansion capacity suited for those whose growth needs are limited. There are eight expansion slots in the chassis (three EISA, four PCI and one shared).

There were four SCSI disk drives in the unit we tested, mounted in a swing-out cage. All four drives are connected to the integrated PCI UltraWide SCSI controller.

Our hardware technicians found the cage design easy to work with for disk and board access. The only negative we found in the hardware design was that, although it was very easy to dismount the processor board for repair work, it was too easy to place the board back into the chassis without seating it at all. We expect this operation to be rare but important when done. (Note: This system also is available under the Zenith Data Systems label as the Z-Server LE2000.)

In absolute terms, it was third in the pack, but the NEC server had the smoothest performance curve. As workload increased, its performance neither rose nor fell as dramatically in any category as the other systems.

That seems to make it a good candidate for the smaller group that wants a solid performer it intends to set and forget.



Double play, page 94

Double play!

CONTINUED FROM PAGE 92

SNEAK PEEK

Pentium II servers should reach 300 MHz within a year; Microsoft's Wolfpack clustering technology should come together in stages

By Amy Malloy

NEXT STOP: 300-MHz Pentium II servers that can be clustered under Windows NT to compete with RISC-based machines. This scenario may seem far removed from the prevalent 200-MHz Pentium Pro single-server environment of today. But analysts say it will come to fruition some time next year.

Intel Corp.-based servers are on the verge of major improvements, partially because of increased speed, but also thanks to clustering technologies. *Computerworld* spoke with four analysts to gather projections and buying advice in areas of performance, scalability, service and support, and pricing.

Pentium II

Performance improvements are just on the horizon for Intel-based servers because of the recently released Pentium II processor. Although PCs with Pentium IIs are out now, the majority of Pentium II servers won't be out until this summer, when a new version of the Pentium II with Error Checking and Correcting memory arrives, according to Intel. The Pentium II offers speeds that range between 233 MHz and 266 MHz, but the Pentium Pro performs only at speeds of up to 200 MHz. "For the most part, the Pentium II will replace Pentium Pros in dual-processor servers," says Joe Barkan, a research director at Gartner Group, Inc. in Stamford, Conn.

Four-way servers and up will continue running with Pentium Pro processors, because the Pentium II can scale up to only two processors, says Peter Lowber, a senior analyst at Datapro Information Services Group, Inc. in Lexington, Mass. That will be the case until a new version of the processor, code-named Deschutes, appears in the first quarter next year, according to analysts. That architecture will scale up to four processors and will perform at speeds above 300 MHz, Lowber says.

Those who buy servers during the second half of this year should ensure that vendors will provide upgrades to the Deschutes processor if it is available, Barkan says. He says he expects vendors to offer that capability.

Wolfpack

Performance boosts are going to be coupled with new scalability offerings thanks to new clustering technology. Initially, users will cluster nodes of Pentium Pro servers. Eventually, Pentium II servers will replace Pentium Pro servers in clusters. Some clustering is available, but Jerry Sheridan, director and principal analyst of the client/server computing group at Dataquest in San Jose, Calif., says clustering will really take off once Microsoft Corp.'s Wolfpack is available.

Microsoft is preparing to release Wolfpack, which is the vendor's clustering technology for its Windows NT Server environment. Microsoft announced the project in October 1995, and Wolfpack was scheduled to come out in the first quarter last year. Now it is scheduled to appear this summer.

"The first version [of Wolfpack] this summer will be no better than Unix was in 1990," Lowber says. Although Unix today can support up to eight servers, Wolfpack will support only two initially, Lowber says. Under the first version of Wolfpack, there will be fail-over, which means that if server "A" goes down, server "B" will take over the workload of server "A". While both servers are up, each one will process its own workload.

"Microsoft has an arrow pointed at the heart of Unix. They want it dead. They need to start tying these [Intel servers] together, so they can compete better with the Unix crowd," says Brian Murphy, director of client/server research at The Yankee Group in Boston.

The second phase of Wolfpack — scheduled for release in 1998 — will be load-balancing, Murphy says.

Load-balancing provides a way to monitor all of the resources in the cluster, making it possible to prioritize the workload, according to Lowber. If a server fails, less important applications can be dropped out, providing additional computing power for the most important applications, he explains.

Clustering provides high availability. Each server has its own operating system, memory and workload.

But symmetrical multiprocessing (SMP) systems aren't leaving the scene. Sheridan says there will be an increase in the number of processors in an SMP configuration.

Advanced Logic Research, Inc. already offers a six-way system, and NCR Corp. is about to ship a 10-way server.

Storage

Performance boosts and increased scalability will also come from other technology improvements. For instance, Fibre Channel, an American National Standards Institute standard, provides a way to interconnect systems or storage systems. Currently, storage systems for Intel-based servers attach through SCSI controllers, which gets messy when users increase disk capacity because of the number of cables involved, Lowber says. Fibre Channel is much faster and easier to configure, in part because users can configure servers in one room and storage in another room, Lowber says. Fibre Channel can cover longer distances than SCSI. Compaq Computer Corp. is scheduled to have a Fibre Channel storage solution offering this summer, according to Lowber. Compaq is "typically the first to market in terms of getting solutions out there," he says.

Barkan mentions a couple other offerings that will improve scalability and performance.

According to the I2O Special Interest Group, performance will improve with the adoption of Intelligent I/O (I2O) architecture, which will address bandwidth problems in servers and across the network by streamlining data transfer rates and reducing processor involvement in I/O functions. It is scheduled for release in the second half of this year, Barkan says. There are servers with I2O support, but the software isn't ready yet.

The first version of Hot-Plug Peripheral Component Interconnect (PCI) will be available later this year, making it possible to replace PCI adapters without shutting down the systems, which will reduce downtime. Compaq will be showing that technology this week at PC Expo.

Support/Service

Clustering Intel-based servers will make server management more complex and service and support more important. A lot of Pentium Pro server users now manage their servers on their own, but the complexity of clustering may increase the need for service and support, Barkan says.

Sheridan agrees. "The service and support providers will have to offer more guidance and counseling in configuration, implementation and maintenance of these systems," he says.

Which vendors will offer the best service and support remains to be seen. Even though vendors such as Hewlett-Packard Co., IBM and Digital Equipment Corp. offer global services, it doesn't mean that they will provide better service than a reseller, Barkan says. And vendors such as NCR Corp., Amdahl Corp. and Tandem Computers, Inc. are used to providing a high level of support, but these vendors haven't proved they can do it in the new scalable NT environment created by Wolfpack, Barkan says.

The vendors that can support servers in mixed environments are in the best position because few companies operate in a single environment these days, Lowber says.

Price

Barkan predicts Intel server customers will get more for their dollar. He anticipates a 30% to 40% price/performance increase. Price will remain constant, but performance will increase, he says. He does expect some price increases. For instance, four-way servers and larger will go up in price, but low-end servers will drop a bit, he predicts.

As vendors add more capabilities and processors to Intel servers, prices will rise, Sheridan says. If Intel servers come out with powerful, less expensive servers on a par with RISC servers, RISC vendors will retaliate with either a comparable product or reduced prices, Sheridan says. □

Malloy is associate editor, Buyer's Guide.

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The Microsoft Windows PC Partners Series

"Everybody seems to be talking about total cost of ownership. In the last week, I've read ten different ways to measure it, six different names to call it, three different approaches to begin thinking about it, and two different strategies to cope with it. To be frank, I just want to solve it."

what works?

Speaking Productively: A Partnership Approach to TCO

This is a story about productivity. It's also a story about partnership. But it isn't a story about the horrors of TCO. You don't need another article to tell you what you already know: that PCs cost too much to manage, to run, to upgrade. **What you need are answers.**

So within this article, we're going to give you some answers. We're going to paint a picture of what your computing environment could look like in less than a year, and how, working hand-in-hand with our partners, we're going to deliver it.

Listening to our most important partner. You. At Microsoft, when we set out to study TCO issues, we went straight to the source: CIOs. IT managers. System administrators. People like you who live and breathe cost of ownership issues every day. And who have a very clear idea of what the future could be if someone would just stop for a moment, and listen.

So we did. We listened. Then we joined with PC and key component manufacturers who also were busy listening. And using what we heard, we forged partnerships with them founded on a common belief: that it is not enough to lower costs here and there; what works is to increase productivity *everywhere*. Only then can we all realize dramatic savings. Only then can we focus on what's truly important: total business value.

A word about these partnerships. These aren't simple ink-and-handshake deals; this is old-fashioned teamwork. We don't just pick up the phone and chat. We live in each others' offices. We hammer out specs. We share customer input. In short, we put our collective heads together. And you know where it's taken us? To a long-term solution that doesn't just address the cost of ownership problem. It tackles it head-on. And at the same time, ushers in a new era of computing that will help people accomplish more. With less. Here's how.

> "What does helping people
> and faster have to
> Everything."

Standards are empowerment. Our strategy is founded on standards. Standards are glue. Standards extend the value of a distributed environment by ensuring that all the pieces fit together seamlessly. They aren't one company's idea of what comes next. Standards are simply this: roadmaps. And they belong to us all.

The fact that the Microsoft® Windows® PC environment is based on standards is no accident. And the result—that it has empowered millions of people to get more work done in less time—is no coincidence.

As the Windows PC environment continues to evolve, its ability to empower won't change. It will grow. From the handheld Windows CE, to the portable computer, the desktop PC, the Windows NT® Workstation, to the newest kid on the block—the NetPC—the Windows PC platform will enable people to be even more productive no matter where they are. Because while all these pieces work separately, they also work in one other important way. Together.

work smarter, better, do with lowering TCO?

That's an interesting point to bear in mind as you consider your next technology move. Because while others may offer technology they claim also works, the question is, what will it work *with*?

Enabling, not disabling technology. With our partners, Microsoft will soon be delivering two key productivity solutions based on standards: The Zero Administration Initiative for Windows (ZAW) and the Network PC. Take a closer look at the NetPC.

Designed as a complement to, rather than a replacement for, your organization's existing environment, the NetPC is an example of how, with our partners, Microsoft has eliminated extra costs by tightening the standards for the corporate PC—without jeopardizing the kind of flexibility and compatibility organizations need to be productive. At the core of these tightened standards is the right balance of centralized control.

"Right balance" is the key phrase there. It offers the kind of control that allows your network administrators to remotely configure, upgrade, and manage systems (which means, among other things, that individuals will no longer be able to install "junkware" on their work systems). But it also includes a hard disk—which ensures that, even if the servers get busy or the network goes down, productive work doesn't go down with it.

Moving it all forward. But what about your existing desktops? That's where Zero Administration Initiative for Windows comes in. ZAW is a long-term plan that will bring you a far easier and better way to deploy and manage your organization's desktops. How much easier? Picture this: in the future, upgrading 250,000 desktops will require three exacting steps: Point. Click. Go to lunch. It'll also be that easy to update the operating system—or perform almost any of the countless tasks that take your time, but not your talent.

ZAW also enables the development and deployment of the widest range of applications and supports the last important concept we want to highlight today: Choice.

The NetPC—A worker's workhorse:

- **is based on standards and is fully Windows compatible**
- **supports core functionality like printing—features people commonly rely on to get their jobs done**
- **is user-centric, enabling a worker to log onto any machine and immediately access their own environment**
- **integrates seamlessly into your existing environment**
- **reduces administration costs by balancing centralized control with individual need, enabling customers to locate data on the server *or* the client**
- **is cost-efficient**

Choice is the power to select from any of more than 100,000 Windows-compatible applications (including your own custom programs) to run your business. But choice goes beyond what's here now; it's also about what comes next. Because choice enables the freedom to move forward to new technologies as *you* see fit, backed by the power of compatibility, interoperability, and integration.

An evolutionary beginning. Add it all up—Windows PC, the NetPC, ZAW—and you're left with the three basic tenets of our partnership approach to productivity. Empowerment. Simplicity. Choice. Together they comprise an evolutionary strategy that puts the TCO issue where it belongs: in the soon-to-be extinct category. And ends this story with something you don't often find: a new beginning.

By the way, if this strategy sounds like a productive way to solve your TCO issues, then take a moment and pat yourself on the back. The ideas came from you. All we and our partners did was take the time to listen. And make the commitment to act.

from our partners

Compaq: Sensible Scalability. At Compaq, we're not only committed to helping corporations find new ways to lower costs—we're providing a full spectrum of scalable solutions that make them reality. Today Compaq offers the full line of Windows PC platforms. From the hand-held Windows CE, to the NetPC, to the laptop, on up. We do so because we know our customers share a common need for continuity. The kind that ensures all the different parts will work just as well together as they do alone.

As we worked with Microsoft on the NetPC specification, it soon became clear to us that here was the missing piece: A computer designed for a new class of end user; someone who needs the performance and compatibility offered by PC architecture, but not the expandability of the mainstream PC. Add in ZAW, with its easy deployment and management capabilities, and it's easy to see where this technology will take our customers. Straight to the bottom line. And well in the black.

Dell: Open Standards Flexibility. At Dell, we have a thorough understanding of the cost of ownership issue. Because we speak directly to more than 50,000 of our customers every day. Know what we've heard? That it isn't enough to make a low-cost PC.

We couldn't agree more. That's why we're proud to say we're one of the co-authors with Microsoft on the NetPC specification. This specification addresses the real issues surrounding cost of ownership. And it offers a real solution based on three important customer-driven concerns: applications and performance compatibility, support for existing investments, and adherence to open standards. That last one—adherence to open standards—is especially critical. They are open standards that encourage new technologies to emerge within the frameworks of existing environments and allow customers more product choices.

We're ready for this smarter way to work with our OptiPlex® products. Fully NetPC configurable, they offer the price and flexibility our customers have asked for. How do we know? Because our customers tell us. 50,000 times a day.

For further information on Microsoft's partnership approach to TCO, the NetPC, and ZAW, visit our Web site: www.microsoft.com/windows/newtech/

Hewlett-Packard: Better Productivity. At HP, we believe the PC can be a tool for change. Dramatic change. Not only in the way people interact with it, but in the way the PC can lower costs throughout an organization. That's why we joined Microsoft in the development of the NetPC specification. And from that specification, why we built the HP Net Vectra PC Series.

For end users, the HP Net Vectra PC will deliver the same functionality as a traditional PC—for example, it will run Microsoft Windows and more than 100,000 applications. But from a company-wide perspective, the HP Net Vectra PC will not only cost less, it will lower costs in new ways, through centralized management capabilities. And it will include additional, complementary management features like HP TopTOOLS.

At HP, our goal is to provide the right technology at the right time. From VAR-configured solutions like Windows NT Servers running the BackOffice™ family to the HP Net Vectra PC, we're continuing to do what we've done all along: improve customer productivity. And profitability.

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Microsoft®

www.microsoft.com/windows/newtech/

FAULTY TRANS-MISSION

Can mechanics and radio stars Click and Clack draw insightful parallels between auto repair and information technology? As it turns out, no.

For reasons unclear to just about everyone, more than 2.5 million people each week tune in to listen to a couple of auto mechanics from Cambridge, Mass., mislead callers about how to fix their cars. Well, maybe not mislead them intentionally. But Click and Clack Tappet, known around town as Tom and Ray Magliozzi, freely admit they don't know any more about fixing cars than the mechanic next door. It's just that National Public Radio gives them a weekly show called *Car Talk* so they can prove it.

Knowing that the Magliozzis are both MIT graduates, we thought it might be fun to find out how much the brothers know about computers. And Tom and Ray thought it would be a great time to plug their new World Wide Web site, *cartalk.msn.com,* which features audio clips, trivia questions, car reviews and more. *Computerworld* editor Paul Gillin spoke with Tom and Ray at the WBUR studios in Boston.

Tom (left) and Ray Magliozzi

PHOTOS BY RICHARD HOWARD

Faulty transmission, page 98

FAULTy TRANS-MISSION

CONTINUED FROM PAGE 97

CW: Bill Gates is worth about $25 billion...

TOM: Wait, I thought *you* were Gates.

RAY: Hey, throw this bum out.

CW: If you had that kind of money, what kind of car would you buy?

TOM: Well, it gets to the point where the amount of money you have doesn't matter anymore because you can only buy so much car. So the fact that he has billions and billions of dollars means he can buy lots of cars. Everyone should have lots of cars. Because you never know what kind of mood you're going to be in.

RAY: Like my brother. He has lots of cars. But none of them is worth more than 75 bucks.

CW: Are you guys PC guys or Macintosh guys?

TOM: Oh, woo hoo hoo! This is the never-ending controversy.

RAY: I have one of each. So I've hedged my bets. But I'll defer to my brother because he has some, shall we say, observations about them.

TOM: Well, I do have some feelings about them because I am, and always have been, a PC guy. In fact, at one point about five or six years ago my wife, despite my urgings, bought a Macintosh. That thing either knew that I hated it or whatever, but it never worked. Macintosh just makes me crazy. I don't think it's as intuitive as they try to make it out to be. And it certainly doesn't have technology anymore that PCs don't have.

RAY: Of course, a few years ago, we went to the computer store — [Tom] and I and my family — to buy a computer for the home. And he says, "You *have* to get a Macintosh!"

TOM: [Laughter] Well, it was for his kid, who was going to get all these games that my kid already had. So he was going to get this big library of games. That's what the Mac is. It's a computer for playing games. If you've got anything serious to do, you can't do it on a Mac.

Oh, I see [producer] Doug Berman is notifying us that our show is edited on a Macintosh. And that's why it's so lousy! I've been telling you guys this for years!

COMPUTERWORLD

You can listen to selected audio clips of this interview, complete with all the hysterical laughter, by visiting our Web site, *www.computerworld.com*.

CW: You guys went to MIT. A lot of our readers are technology guys. How can they, too, set themselves up for a career in auto mechanics?

TOM: Flunk 801!

RAY: Twice! [Laughter]

TOM: That's the freshman physics course I had a little trouble with.

RAY: In his junior year!

I decided along the way that I didn't really want to be an engineer. I didn't want to design windshield wiper linkages for the rest of my life. I wanted to do something that was more fun. And that was to *repair* windshield wiper linkages for the rest of my life. And I've gotten quite good at it, as a matter of fact.

> "There's nothing like a few bursts from the air chisel to sober up a recalcitrant hard drive."
>
> – Tom Magliozzi

CW: Why should a computer professional visit your Web site, cartalk.msn.com?

TOM: To waste time. This is time-wasting central. If you're going to goof off, you might as well goof off with us because we have fun.

RAY: Realize that Americans work too damn hard. You go to Europe and everyone is always on vacation. We think people need to goof off more and be less dedicated to work, so we're doing our small part with our site.

CW: You guys are mechanics. What good are computers to you?

RAY: Are you kidding me? They have made cars so complicated that the average Joe can't fix 'em, so they have to bring them to us.

TOM: And you can't fix them either.

RAY: Well, no, but we keep them until another one comes in just like it, and then we swap parts. We had to offer one car that works. "Alright, who wants it this week?" [Laughter]

CW: What do you think is the real value of the Internet and the Web?

RAY: Ah! The real value. I think it is going to keep people off the streets at some point. It will reduce crime because people will stay in front of their screens. It will reduce problems that people have in personal relationships. People won't have to deal with one another on a personal level.

TOM: But when you come right down to it, the real value is it has allowed nerds an opportunity to be anonymous.

RAY: To talk to each other.

TOM: No, to talk to babes. I mean, no nerd would dare talk to a female for the last thousand years, but now you can type it. Remember all those college mixers you went to, and all the nerds with the 25 pens stuffed in their pockets would just sit against the wall? No more. Pimples on your back? No problem!

CW: Cars are getting more and more computerized. How does that change things for you as a mechanic?

RAY: We couldn't figure them out when they had no computers, and we still can't figure them out!

CW: You know that a computer has beaten a grand master at chess. When is a computer going to be able to replace an auto mechanic?

RAY: Soon, I hope.

[Laughter]

TOM: You'll notice that it was an IBM computer that beat Kasparov. I wonder if it had been a Macintosh if it would have won.

RAY: Computers have started to replace mechanics already. We can't fix anything anymore without talking to the car's computer. We hook up the scanner to the car's computer, [and] it feeds us information.

CW: Has any computer ever stood out in your mind as especially memorable or special?

RAY: The one that always comes back to me is my very first computer. The first time is always memorable.

TOM: You took her to the drive-in, right?

RAY: My Radio Shack TRS80, which I bought I think in 1979. I was able, on this thing, to do word processing, statistical analysis — certainly not to the extent you can today, though.

TOM: How big was the hard drive on this?

RAY: My current computer has 32M bytes of RAM. This had 4K. [Laughter] Four thousand bytes, and it worked! I mean, that's the miracle of it.

TOM: And you did everything you had to do with it?

RAY: I did everything I do now! Now, [Microsoft] Word takes 50 megs of memory to work. The TRS80 had a cassette tape.

TOM: Yeah, my kids used to put Grateful Dead tapes in there.

CW: If you guys had computers when you were kids, do you think things would have turned out differently?

TOM: I notice our kids don't go out and play as much as we did. Their playmate is their computer.

RAY: That's probably making a whole generation of antisocial wackos.

TOM: Oh, absolutely. Secessionists. [Laughter]

CW: Is there anything that people who fix computers can learn from people who fix cars?

RAY: We've got to introduce them to the concept of air chisels.

TOM: There is nothing like a few bursts from the air chisel to sober up a recalcitrant hard drive.

CW: What's the toughest problem you ever had as a computer user, and how did you solve it?

TOM: Oh, the viruses.

RAY: Oh, don't tell me about the viruses. Let's not talk about the viruses.

TOM: That was the biggest real problem I ever had. Wiped out everything. I didn't fix it. I bought a new computer. I threw the old one in the trash. Actually I put a new drive in it, and it's now my backup computer.

CW: Which one of you is the bigger computer geek?

RAY: It's my brother. Even though I own more computers, my brother is the bigger geek.

TOM: That's because I bought a computer back in 1979, and I have been struggling for 20 years to figure out how the hell to use it. They really are too hard. Even now they're too hard.

RAY: Do you know what the problem is? It's that geeks — I don't mean this in a bad way — but geeks design them. They aren't designed for the average person.

TOM: It also is their way of feeling superior.

RAY: Have you ever called some tech support line, and they say, "Well, check your high mem — blah, blah." You say, "What the hell is that?" They talk down as though you are the scum of the earth because you don't know how to do it.

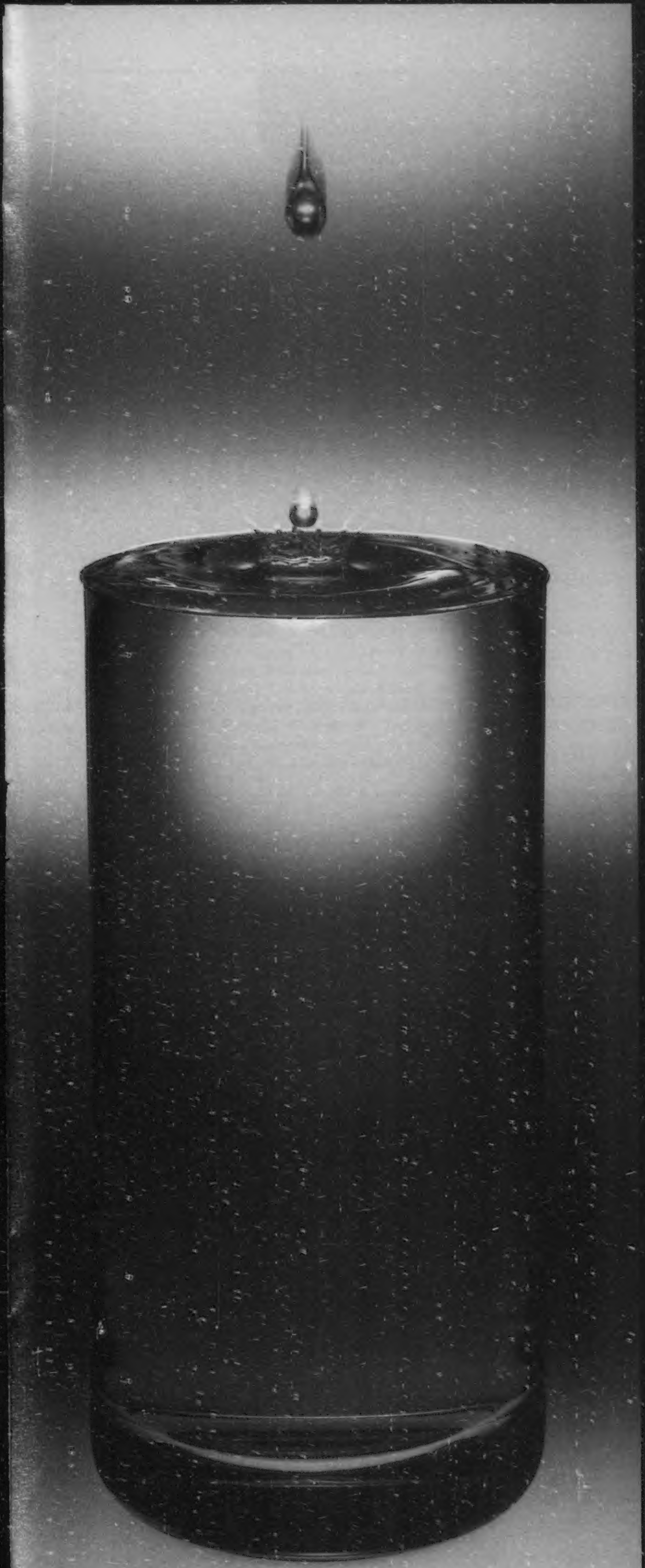
TOM: That's the way the guys were with the 25 pens in the pocket and the pimples on their back that never got anyone to dance with them at those college mixers.

RAY: They are getting even now.

TOM: They're saying, "Oh, hi there. This is Merlin. Remember me with the slide rule dangling from my hip?"

RAY: "Remember the junior prom? You want to defrag your hard drive? Defrag this, baby." ☐

Gillin's Internet address is paul_gillin @cw.com.



SPECIAL REPORT:
IS EDUCATION – CRISIS OR CROSSROADS?

Information technology:
BIG MAJOR on campus

By Leslie Goff

Editor's note: This week, *Computerworld* concludes its four-part series on IS education, written by Leslie Goff. Parts 3 and 4 this week take a look at campus recruiting trends and the growing debate over the role of colleges in producing marketable graduates. The full text of Parts 1 and 2, which looked at IS college enrollments and changes in IS curriculums, can be accessed at our World Wide Web site at *www.computerworld.com*.

After years of shunning recent college graduates in favor of experienced information systems professionals, MCI Communications Corp. last year launched an ad hoc campus recruiting effort to draw new talent into its IS ranks.

Working on a directive from Chief Information Officer Lance Boxer, the company's Colorado Springs IS organization placed a young, articulate and exuberant mainframe production coordinator in charge of information technology recruiting. That coordinator, Abbie Plessman, traveled to more than 25 universities across the country to sing the praises of working at MCI and, more important, to identify strong candidates for technical support positions throughout the company.

College scouts are back with a vengeance and are making introductions earlier in a student's life

RANDALL ENOS

"A college hire can bring a lot of energy and new ideas to a company," Plessman says. "With the [British Telecommunications PLC] merger and the company growing so fast, we realized that we need really good, talented people coming out of school, whereas before we only hired seasoned employees. But industry trends have changed, and hiring needs have gone along with it."

Campus recruiting is back. Staff-hungry IS departments are identifying candidates early in their college careers and following them through graduation.

Campus recruiters want it all: college graduates with a good foundation in business process analysis and design, communication and teamwork skills, technical know-how, understanding of both classical and cutting-edge programming languages and tools, and plenty of energy.

But employers' march back to campus is mainly fueled by their overwhelming need for Cobol programmers to satisfy year 2000 conversion project requirements. For example, 75% of MCI's campus hires were earmarked for mainframe support.

"There's no such thing as a cheap Cobol programmer anymore, because not a lot of young ones are coming into the marketplace," says Jerry Batt, vice president of billing systems at AT&T Corp.'s Consumer Billing division in Dallas. "And I don't think the supply-and-demand problem has hit bottom yet."

Even with increased enrollments, supply and demand remains an issue. Batt says he wishes there were more students to choose from, but he adds that he's encouraged by their enthusiasm for the IS profession and their demonstrated industry knowledge: They seem to have a sense of purpose and are insightful and well-read.

Batt's division starts eyeing students late in their sophomore year, when they have to declare a major. He makes sure his IS group is well-known to Texas college students by making personal appearances and giving class lectures across the state.

Elsewhere, companies offer internship programs, endow faculty chairs or contribute equipment to state colleges constrained by tight budgets. Universities are capitalizing on industry's willingness to forge alliances with academia, and employers gain from increased visibility among potential recruits and the opportunity to try before they buy.

"We recruited the sponsors because what they're doing [in IS] is often ahead of what's going on in the university, and it also brings in funds that help us bring our educational technology up to date," says Gordon Davis, a professor of MIS who holds a chair at the Carlson School of Management at the University of Minnesota at Minneapolis. The chair is endowed by Minneapolis-based Honeywell, Inc.

"We have the highest number of graduates placed in jobs across the whole business school," says Eleanor Jordan, who heads up the faculty of the management sciences and IS department in the College of Business at the University of Texas in Austin. "It's been pretty close to 100% placement for the last three or four years."

And salary offers made to IS students are consistently the highest at the college, ranging from $33,000 to $44,000 and averaging $38,700 for this spring's graduates, Jordan says. "We had one student who got $60,000 from a consulting firm because he had had two internships" relevant to its practice area, she says.

News like that travels fast and attracts defectors from other areas of the business school and nonbusiness majors. "When we recruit, we find more students than we used to coming in from other majors and seeking IT jobs. And we're glad to consider them," Jordan says.

It's up to employers to capitalize on the enrollment increase in the face of a shrinking pool of experienced candidates, Plessman says. "Companies need to be thinking quicker on their feet about hiring college grads than they were in the past. They need to plan ahead and think about more formalized recruiting strategies to generate a good pool of kids to choose from," she says. "The sooner you can pull a kid into your workforce, the better the investment." □

SPECIAL REPORT:
IS EDUCATION – CRISIS OR CROSSROADS?

Workforce Outlook:
SKILLED for TODAY, or TOMORROW?

The debate is growing over the role of colleges to produce career skills vs. market needs

CHANGES IN INFORMATION systems degree programs are drawing new students to the major, and IS recruiters are taking advantage of the increase in enrollments. But the shift from traditional computer science classes to those that focus on specific tools and languages is fueling a debate over the role of the university in shaping students' long-term career prospects.

The pressure on business schools to matriculate ready-to-produce entry-level IS professionals has reached an apex as companies struggle to staff year 2000 conversion efforts and new application development projects.

As recruiters swarm campuses seeking skilled graduates, industry is pushing schools to adopt new curriculums based on distributed architectures and client/server computing and urging them to add courses in business communication and teamwork skills. But industry also demands that schools not eliminate any of the old standbys such as Cobol and mainframe fundamentals.

With only four years to cover all that ground, business schools are forced to make trade-offs that both please and distress the larger IS community. Students favor classes that cover the hot topics of the day — Introduction to Java is a lot more crowded than Introduction to the Mainframe. But many critics complain that retooled IS degree programs that focus on new technologies start to look a lot more like vocational training than university education.

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"We are not a trade school," says Margo Selzer, a professor of computer science at Harvard University's department of engineering and applied science. "I firmly believe that universities that target their students for corporate IS careers are doing both the students and the corporate IT world a disservice."

But local industry is pushing many state-supported business schools to adopt heavily technology-centered curriculums. Recent changes in the management science and IS curriculum at the University of Texas in Austin, widely considered to be one of the best IS programs in the country, refocused the curriculum on client/server-based tools and architectures, emphasizing courses such as C++ and Visual Basic. In a move that drew some resistance from campus recruiters, the school dropped Cobol from its requirements last year and added new classes such as Advanced Data Communications, and The Internet and Intranets.

In contrast, enrollment in Harvard's program has crept up slowly but steadily over the past 20 years, Selzer notes. The bachelor's degree in her department focuses on problem-solving, systems design and the software development process but doesn't include any introductory classes in C or other languages. At the junior and senior levels, the curriculum offers a "very classical computer science education," with general courses in operating systems, languages, distributed systems, computer architectures and compilers. The use of specific tools is integrated into those broader topics.

"We are not training people to be IT professionals," Selzer says. "We are teaching them a discipline that is obviously becoming more important in today's society ... and the particular tools are irrelevant."

Jerry Batt, vice president of systems at AT&T Corp.'s Consumer Billing division and a member of the industry steering committees at the University of Texas, Texas A&M University and Virginia Polytechnic Institute and State University, notes that industry doesn't expect academia to become an IS training ground. "They can't teach every application and tool," he says. "Industry has to provide that. On the steering committees I've served on, we're in agreement that what we want is graduates who can solve problems and who can integrate the different design methodologies and technologies they've learned in such a way that they can adapt quickly on the job."

One solution to the training vs. education quandary might be to offer five-year degree programs in IS, Batt suggests. "If you look at the explosion of new IT requirements and capabilities, combined with the fact that very few older technologies simply go away, it's very hard to put all of this into four years," he says.

"But the academic community is constrained by budgets, faculty and other resources, so it is forced to make trade-offs. Their question usually becomes, 'What is most in demand by industry?' and then they try to straddle that," Batt says. ☐

Goff is a freelance writer in New York.

The new IS curriculum at the Carlson School of Management

The faculty of Carlson, at the University of Minnesota at Minneapolis, based its MIS major on the recently released IS education model established by a joint committee of three industry associations: DPMA — The Association of IS Professionals, the Association for Computing, and the Association for Information Systems. An Adobe Acrobat download of the model is available at *webfoot.csom.umn.edu/faculty/gdavis/curcomre.pdf/*.

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Systems Analyst for technical consultant services firm. Duties include: Plan, develop, test and maintain programs in RPG/400 and COBOL/400, Query/400 and CL/400 languages on an IBM AS/400 environment for the parts Department of a car dealership software package. Evaluate user requests for enhancements; formulate program development, present a prototype to user for approval by applying system walk-through techniques, design files, screens and reports, code programs, test and prepare for general release to customers; Train and provide technical support assistance to customer support personnel. Requires a Bachelor's degree in Electrical Engineering. Requires two years experience in the job offered or two years experience as a Programmer/Analyst to include experience in RPG/400, CL/400, COBOL/400 and Query/400 languages on an AS/400 environment. Salary is $57,000.00 per year. Hours are 8:00 am to 5:00 pm, forty per week. Send resume to 7310 Woodward, Room 415, Detroit, MI 48202. Ref. # 1734-96. Employer paid ad.

Systems Analyst - On site debug of computer interfaces between our quality control software products and customer equipment; liaison with customers such as training, programming and consulting, including development of customized statistical control seminars tailored to individual requirements; development of software for statistical process control to monitor and improve quality control in the manufacturing process of customers. 40 hr. wk., 9:00am - 5:00pm. Five years college with Master's Degree in Computer Science or Mathematics. Academic background must include at least one semester of the following course work: Statistical Quality Control I & II, Multivariate Methods, Mathematical Statistics. $50,065 yr. Emp. paid ad. Resumes to: 7310 Woodward Ave., 4th Fl., Detroit, MI 48202. Ref #1760-96.

Database Analyst: Develop s/w to realize integration of 2 mechanical engineering s/w packages; FCRASH & Hypermesh used in numerical simulation of auto testing; design & develop graphical user interface using C & X window/Motif to manager & control data processing at Ford Motor Co.; perform object-oriented design on new projects; debug & test s/w using X Runner. Req: MS in computer science or mech eng; 6mon exp in job offered or related as research ass't, related exp include using C, C+, Nastran & Fortran. 40hr/wk, 8-5pm, $42,347.20/yr. Send resumes to 7310 Woodward Ave. Rm 415, Detroit, MI 48202. Ref No. 187196. Employer paid ad.

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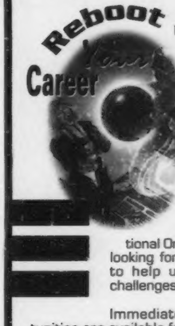
Computer Software Consultant; Analy., design, and devel. manuf. software syst. based on ISO9000 and SQA stds in MVS/ESA on IBM ES9000/820J; E-R modeling and integ. w/ manuf. proc. and engin. stats.; use CICS/ESA, DB2/SQL, VSAM, QMF, TSO/SPUFI, CLIST, TSO Rexx, JCL, COBOLII, Xpeditor, BMS/GT, FILE-AID, Abend-AID, Omegamon DB2 and CICS, ACF2, UCC11, Panvelet, EasyTrieve Plus, and Lotus Notes; MIN QUAL: M.S.-CompSci; 1yr. exp. as Comp. Prog./Analyst; Exp. must incl.: MVS/CICS/ESA, VSAM and DB2 with E-R modeling and SQL, QMF/SPUFI and File-Aid, COBOLII and JCL w/ UCC11 and EasyTrieve Plus, Intertest and Adend-Aid, CLIST and TSO/RExx. M-F, 8am-5pm; $45,000/yr.; Employer Paid Ad; Send resume to: 7310 Woodward, 4th Floor, Detroit MI 48202; Ref# 1677-96.



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SYSTEMS ANALYST. Analyzes user requirements, procedures, and problems to automate processing or to improve existing computer system. Bachelor of Science degree in computer science, engineering, or math-related, and 2 yrs. exp. in job offered req'd. Must be able to travel. 2 yrs. exp. in C, C++, Fortran, Basic, Assembly, Visual C++, Borland C++, and Tools OOM (Booch, Rumbaug), Rational Rose, Paradigm Plus. $41,000/yr. Interested applicants are directed to apply by resume to Georgia Department of Labor, Job Order # GA 6112285, 2943 N. Druid Hills Road, Atlanta, GA 30329-3909, or the nearest Department of Labor Field Service Office.

SYSTEMS ANALYST. Analyzes user requirements, procedures, and problems to automate processing or to improve existing computer system. Bachelor of Science in Computer Science, Engineering, or math-related, and 2 yrs. exp. in job offered or as software engineer req'd. Otherwise, Master's degree in computer science, engineering, or math-related, and 1 yr. exp. as software engineer req'd. Must be able to travel. 1 and 1/2 yrs. exp. UNIX Systems (IBM AIX3.2, HP-UX90, Solaris SS) and Informix 2.1 using ESQL/C, Informix 4GL, C, C++, TCP/IP. $41,000/yr. Interested applicants are directed to apply by resume to Georgia Department of Labor, Job Order # GA 6112286, 2943 N. Druid Hills Road, Atlanta, GA 30329-3909, or the nearest Department of Labor Field Service Office.

SYSTEMS ANALYST, Jackson, Georgia. 40 hrs/wk, $38,000 yr. Requires 4 yr degree in computer engineering and 1½ yr exp. Duties are to Design, customize and install PC Focus and Dataease software packages and install and maintain computer network systems for use in petroleum industry. Write customized database software packages using C, Visual Basic and Clipper. Write programs to maintain business records and accounts. Install and upgrade retail outlets with a computerized Fast Pay system for use at gasoline pumps. Install electronic tank monitoring systems at retail outlet. Design and code accounting, management analysis and research software packages to provide comprehensive management information. Interested applicants report in person or send 2 resumes to GA Dept of Labor, Job Order#6109994, 1514 Highway 16 West, Griffin, GA 30224-0736 or the nearest Dept of Labor Field Service office. AN EMPLOYER PAID AD.

SOFTWARE ENGINEER: Development of a Graphical User Interface front-end for a telephonic application system using Borland C++ in a WINDOWS environment. Must have demonstrated ability in Object Oriented Design & Development methodology using Borland C++ and demonstrated ability using C and OWL. Must have B.S. in Math, Engr, CompSci, or Related Field & 3 years experience in job offered or in software development. 40 hrs/wk, 8am-5pm, $70,000/yr. Send 2 resumes to Case #61136, PO Box 8968, Boston, MA 02114.

Senior Software Consultant: Analyze client computing/information system req., recommend app. software packages/dev. original custom software pkgs to meet needs. Test/install programs, software pkgs, accessories assuring user friendliness/satisfaction of customer data processing req./specs. Debug/make changes to software elements after installation. Req: Bachelor's in Mathematics, Statistics & Operations Research, Computer Science or closely related discipline + 4 yrs exp or 4 yrs in managerial position(s) in computer, data processing ops. $55,000/yr, 40 hrs, 8:30-5:30. Submit resume to: FDLES Bureau of Operations, 1320 Executive Center Drive, Suite 110, Tallahassee, FL 32399-0667. Re: Job Order # - FL 1615126.

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Software engineer: Designs and develops software for use in creation of oil company fuel site automated control systems. Uses Object Oriented Design and Analysis and CASE tools to implement software in client/server environment including structured software solutions for multi tasking and real-time environment. Uses Object Oriented Programming to implement a Java language business service internet connection for implementation of such systems into third party computers. Require M.S. or completion of all requirements for M.S. Computer Science. Education to include completion of one project using Object Oriented Design and Analysis in conjunction with CASE tools. And one project in use of Object Oriented Programming to implement Java connection. Please send resume to: B. Palomo, Admin./Comp. Mgr., Petro Vend, Inc, 6900 Santa Fe Drive, Hodgkins, IL 60525. No calls.

System Analyst: Responsible for systems development activities & maintaining operation integrity of computer application systems including efficient program coding, preparation of technical specifications & program documentation, validating accuracy of programs through planning & performing unit & system testing activities on UNIX using C & COBOL. Req: MS in computer & information system; 4mon exp in job offered or related as programmer, related exp include coding in C & COBOL on UNIX environment. 40hr/wk, 8-5pm, $42,347.20/yr. Send resumes to 7310 Woodward Ave. Rm 415, Detroit, MI 48202. Ref No. 181496. Employer paid ad.

SAP CONSULTANT (APPLICATION SYSTEMS ANALYST LEAD) - Oakbrook Terrace, Illinois; Lead lower level consultants in developing, integrating & configuring SAP (Systems Applications & Products in Data Processing) modular computer software system by utilizing in-depth business knowledge & expertise in the production industry; Work directly w/client functional areas including materials management, plant maintenance & controlling software & manage on the spot integration issues; Define & execute portions of work plan as see fit; Propose possible business opportunities; Mentor & instruct lower level systems analysts; Design & configure complex business gap interfaces; Bachelors Degree in Comp. Science, Info. Technology, Math, Bus. Admin, Mgt. or Engineering required. Employer will consider 5 yrs of progressively responsible work exper. in the computer field as sufficient to satisfy the degree requirement. Must have 2 years exp. in job offered or 2 yrs related exp. as SAP Systems Analyst, Computer Trainer or Consultant. The 2 yrs SAP exp. must incl. materials management, plant miantenance & controlling software in the production industry. $77,000/yr, 40 hrs/wk, 9:00 - 5:00. Must be willing to relocate to worksites w/in the Mid-Western Region. Must have proof of legal authority to work permanently in the U.S. Send 2 copies of both resume & cover ltr (No calls) to: Illinois Department of Employment Security, 401 South State Street - 3 South, Chicago, Illinois 60605, Attn: Sheila Lindsey, Reference # V-IL 16485-L. This is an employer paid ad.

Software Developer. 40 hr/wk from 9am to 5pm. $48,000/yr. Design and implement GUI application written in Visual C++ in a client/server environment for streamlining data into database servers. Design and implement graphical user interfaces using Visual C++ as a front end tool to create data access for individual users based upon the specific needs for data analysis and reporting. Implement and maintain Visual C++ terminal programs to accommodate batch processing and redesign data screens as required for individual end users. Insure network access and data transfer within networked cluster of workstations. Insure integrity of data being transmitted. Require M.S. degree in Electrical Engineering or Computer Science and one year experience in job offered or as Software Engineer including work on GUI application written in Visual C++ in a client server environment and work on batch processing functions and design, implementation and maintenance of Network applications. Must have completed coursers or worked on projects (academic or non-academic) in C++ programming. Must have proof of legal authority to work permanently in the U.S. Please send resumes to Illinois Department of Employment Security, 401 South State Street-3 South, Chicago, Illinois 60605, Attention: Jack Schaffer; Reference #V-IL 16501-H. An Employer Paid Ad. No Calls. Send 2 copies of both resume and cover letter.

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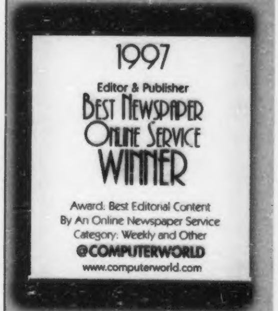

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Senior Systems Analyst - Dearborn, MI to develop and implement system functionality to meet user needs with minimal direction. Demonstrate quality assurance and prepare documentation for enhancements and changes prior to implementation. Maintain an understanding of the department and the tools available in order to successfully plan work detail and meet schedule dates. Routinely uses MS Windows, NT, Visual Basic, Access, Paradox and SQL Server. M-F 8am-4:30pm. 40 hrs./wk. $44,000/annum. Require BS in Electronics and Communication, Computer Science or Electrical Engg. and two years' exp. in the job offered or two years' experience as a Software Engineer, Programmer Analyst or Systems Analyst. Experience must include design, development and implementation of MS Windows client/server based databases and front ends. Send resumes to 7310 Woodward Avenue, 4th Floor, Detroit, MI 48202. Reference No. 164196. Employer paid ad.

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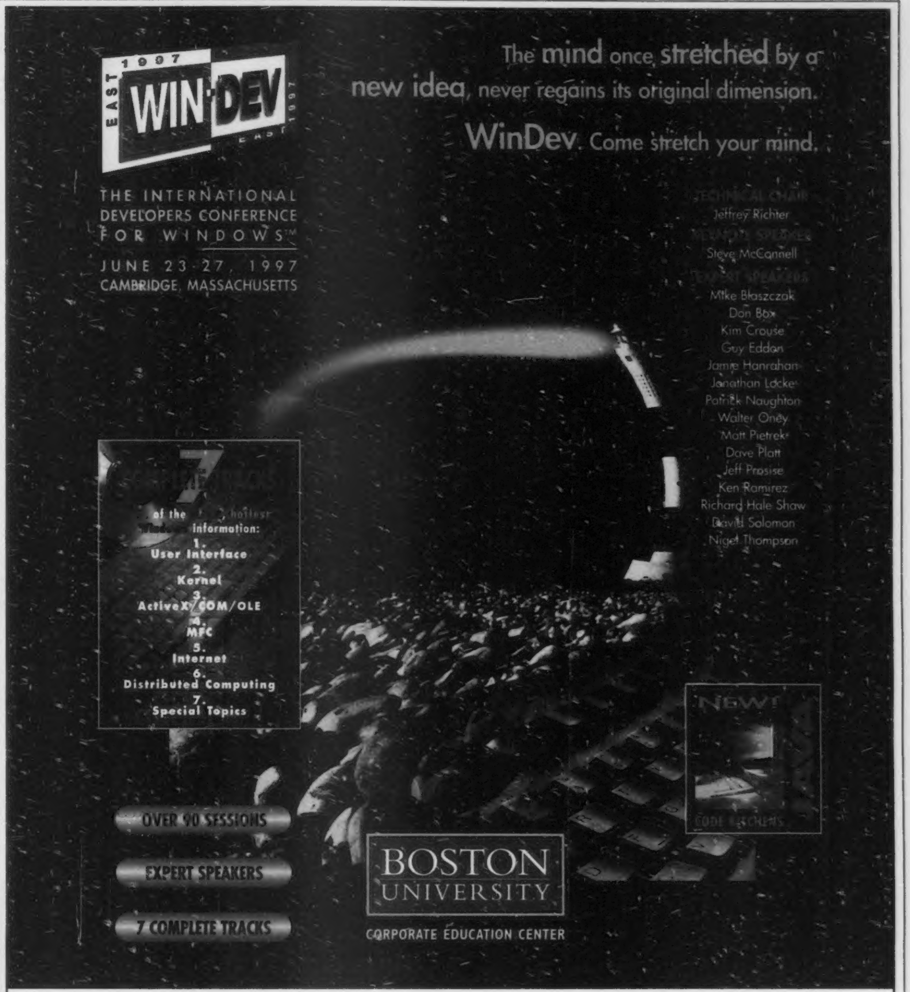

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OFFICIAL RULES - NO PURCHASE, PAYMENT OR CONTRIBUTION NECESSARY - To enter the Sweepstakes outlined below, follow all entry instructions published in this offer. Your entry must be received by the date specified elsewhere in this offer or by 1/15/98, whichever is sooner.

Super Prize Sweepstakes - Winners will be selected in random drawings from all eligible entries received. Early Bird winner will be selected in a separate drawing from among all eligible entries. Sweepstakes begins 9/3/96. Drawings will be conducted on or about 4/30/98 by Ventura Associates, Inc., an independent judging organization whose decisions are final. Drawing will be held at 1040 Avenue of the Americas, New York, NY 10018. You need not be present to win.

CONSUMER DISCLOSURE Different creative presentations of the sweepstakes may present different prize choices. Values at a given prize level will be approximately the same. All prize winners will have the option of selecting any prize offered at level won. Number, estimated maximum retail value and odds of winning each prize are as follows: 1 Grand Prize - $25,000 (or cash alternative of $25,000); 1 First Prize - $2,000; 1 Second Prize - $1,000; 50 Third Prizes - $80; 1,000 Fourth Prizes - $65 each; 1 Early Bird Prize - $5,000. Total prize value: $102,000.00. Certain creative presentations of the Super Prize Sweepstakes may present an Early Bird Prize. To qualify for the Early Bird Prize, if the Early Bird Prize is presented in your offer, your entry must be received by the Early Bird date specified elsewhere in this offer. Odds of winning any prize are determined by the total number of eligible entries received. Distribution of sweepstakes will not exceed 300 million. All Super Prize Sweepstakes prizes will be awarded.

Automobile, boat/trailer prizes must be picked up at local dealer. All other merchandise prizes will be shipped to winner. Boat/trailer and/or automobile title, tags, license and registration fees are winner's responsibility as are any other incidental expenses not specified in the offer. Trip prizes subject to availability and must be completed within 12 months of date awarded. Actual values of trips depend on location of winners and fares at time of departure. Certain restrictions and blackout dates may apply. If a trip prize is won by a minor, minor must be accompanied by a parent or legal guardian. Winner's traveling companion will be required to sign a release of liability prior to departure. Trip prizes are on a space available basis and do not include personal purchases or incidentals. No substitution of prizes, except sponsor reserves the right to substitute a prize of equal or greater value in the event an advertised prize is unavailable.

For winners list (available after 6/30/98) send self-addressed, stamped envelope by 1/15/98 to: Super Prize Winners, P. O. Box 9193, Medford, NY 11763-9193.

THE FOLLOWING APPLIES TO THE SWEEPSTAKES ABOVE - No purchase, payment or contribution necessary to enter or win. No photocopied or mechanically reproduced entries will be accepted. Not responsible for technical malfunctions, failure of computer, telephone equipment or software, inaccurate transmission of entry information or for lost, late, misdirected, damaged, incomplete, illegible or postage-due mail. All entries become the property of sponsors and none will be returned.

Winner notification will be by mail. A winner may be required to sign and return an Affidavit of Eligibility/Liability/Publicity Release within 14 days of date printed on notification or he/she will be disqualified. Any prize/prize notification returned as undeliverable will result in disqualification. If a major prize is won by a minor, it will be awarded to parent or legal guardian and the Affidavit of Eligibility and Release must be signed by the parent or legal guardian. Except where prohibited by law, winners consent to the use of their names, hometowns, likenesses and photographs for advertising and publicity without additional compensation.

Sweepstakes is open to legal residents of the U. S., Canada and Europe (in those areas where made available) who have received the offer. In the event that the designated recipient of the offer has moved, the offer may not be valid in the state, country or province to which the offer has been forwarded. Void in Puerto Rico and where prohibited by law. All federal, state, provincial and local laws and regulations apply.

All prize values are in U. S. currency. No transfer of prize permitted. A winner is responsible for all taxes on his/her prize.

Canadian residents, in order to win, must first correctly answer a time-limited skill testing question administered by mail. Any litigation regarding the conduct and awarding of a prize in this publicity contest by a resident of the province of Quebec may be submitted to the Regie des alcools, des courses et des jeux.

Sweepstakes may be presented in different creative presentations by different organizations. Ventura Associates, Inc., 1040 Avenue of the Americas, New York, NY 10018, the independent judging organization has provided all prizes at no charge. Ventura Associates, Inc., reserves the right to withdraw the promotion if it becomes technically corrupted. Employees of Sweepstakes Administrator, presenting organizations, their advertising agencies and promotional companies involved in this promotion and their families, agents, successors and assignees are ineligible to participate in the promotion and shall not be eligible for any prizes covered herein. The parties hereto acknowledge that SCA is not liable for any prize awards payable to promotion participants in violation of this term.

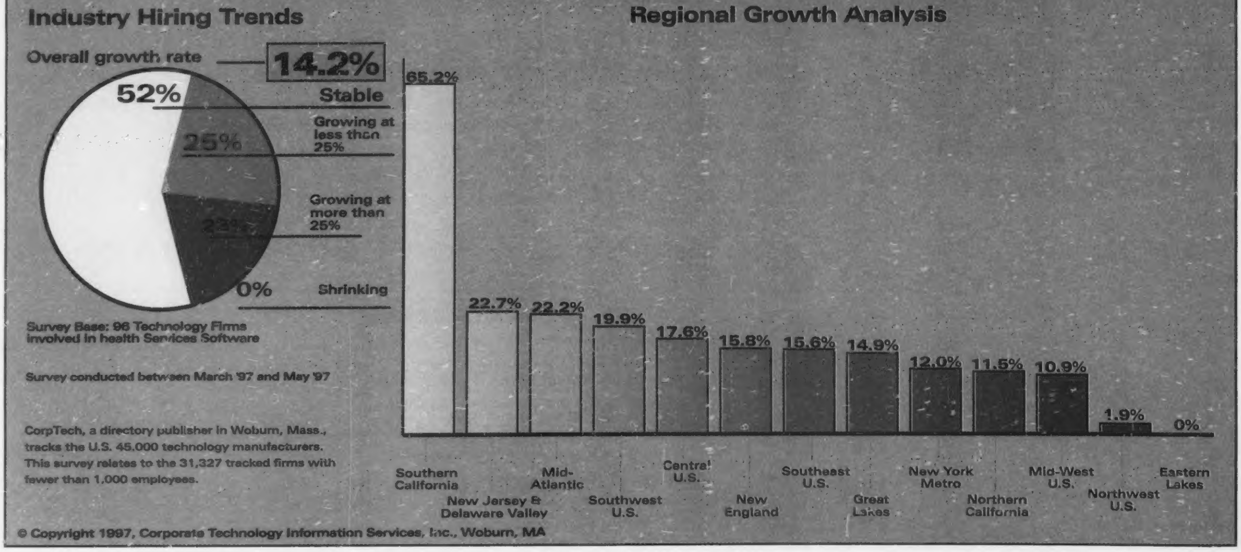
COMPUTERWORLD TECHNOTOYS WEEKLY SWEEPSTAKES OFFICIAL RULES: No purchase necessary. Complete official entry form or print all entry information on plain paper, including this week's prize and fax to: (800)898-2299. Incomplete entries not eligible. Sweepstakes begins 12:01 am (EST) Monday (the date of the issue). All entries must arrive by fax no later than 11:59 am Monday of the following week. The issue date can be found at the top of most pages of this magazine. Sponsor not responsible for telephone or fax equipment failure or delayed transmission. All entries become sponsor's property & will not be returned.

Winner will be determined in a random drawing on or about 5:00 pm (EST) the Monday following the issue date. You need not be present to win. The prize (and its retail value) detailed with the entry form is guaranteed to be awarded & delivered to winner approx. 30 days from drawing date. If notification letter or prize is returned as undeliverable, it will be awarded to an alternate winner at random. No prize substitutions except due to unavailability, in which case a prize of equal value will be awarded. Prize not transferable or redeemable for cash. All taxes on prize are winner's responsibility. Acceptance of prize constitutes permission (except where prohibited) to use winner's name, hometown & likeness for promotional purposes without additional compensation.

Sweepstakes is open to legal US residents, 18 & older. Odds of winning determined by total number of entries received. Est. distribution: 150,443. Sponsor: Computerworld, Inc. 500 Old Connecticut Path, Framingham, MA 01701. Employees of Computerworld, Inc., its affiliates, subsidiaries, retailers, advertising & promotion agencies & immediate families of each not eligible. All federal, state & local laws & regulations apply. Void in Puerto Rico & where prohibited by law.

For winners list (available within 4 weeks of the drawing), send a SASE to: Sweepstakes Winners, Computerworld TechnoToys Sweepstakes, 500 Old Connecticut Path, Framingham, MA 01701.

Career Survey: Health Services Software



Survey Base: 96 Technology Firms involved in health Services Software

Survey conducted between March '97 and May '97

CorpTech, a directory publisher in Woburn, Mass., tracks the U.S. 45,000 technology manufacturers. This survey relates to the 31,327 tracked firms with fewer than 1,000 employees.

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NEW & NOTABLE

TAC Systems' FAXfree software enables users to send color faxes over the Internet for little or no cost

TAC Systems, Inc. announced the addition of color capabilities to their FAXfree software. FAXfree enables Internet users to send color faxes anywhere in the world at little or no cost. Developed for Windows 95, "FAXfree on the Internet" offers the convenience of conventional fax systems without the associated long-distance phone charges. FAXfree transmits scanned color images and photographs, charts, and other traditional facsimile information to Internet e-mail addresses. Faxfree at a one time $49.95 expense, costs less than long-distance fees charged for sending just a few international faxes. A black-and-white version of FAXfree Personal is available for $29.95. A powerful server version which enables multiple users to send faxes over company networks will be released this summer. TAC Systems also offers FAXfree Portal. Available for $1,295 Faxfree Portal connects fax machines to the internet. TAC Systems, Inc., based in Huntsville, Alabama, was founded in 1991. The company specializes in solutions for leveraging information and communications in computer networks. TAC Systems' product line includes data storage peripherals and software that optimizes network information access, retrieval, and transmission.

Contact: Candice Dunaway TAC Systems, Inc. at (205) 721-1976, or e-mail cdunaway@tacsystems.com, or www.tacsystems.com

Fujitsu Brings Easy-to-Integrate Internal 640MB MO Drive to the Desktop

Fujitsu Computer Products of America, the market leader in 3.5-inch magenta-optical (MO) drives, today introduced a high-performance, internal 640MB MO drive that easily installs in PC or Macintosh desktop systems. Fujitsu also announced it has reduced the price of its external DynaMO© 640 MO drive to $499, and DynaMO disks to under $25, expanding the affordability of this high-performance, high-capacity removable storage technology.

Fujitsu's introduction of the DynaMO© 640si. the SCSI internal configuration of the popular DynaMO family, expands the product line of high capacity 3.5-inch 640MB MO drives. The DynaMO 640si brings the advantages of high capacity, cost effectiveness, fail-safe reliability, and near-hard-drive speeds of fujitsu's 640MB technology to users who want optical storage integrated into their desktop PC or Macintosh systems. Target applications include those with high-performance requirements such as multimedia and Internet authoring and any application that requires high data integrity, including publishing, government operations, and whole-system backup.

For more information about FCPA products and services, use our Internet Web site at http://www.fcpa.com The company can be reached by phone at 800/626-4686 or 408/432-6333 or by e-mail at info@fcpa.fujitsu.com.

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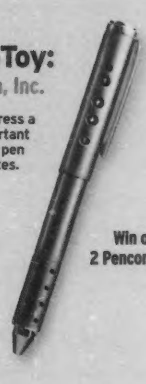

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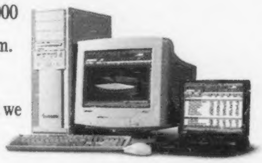
No purchase necessary. All entries must be received no later than 11:59 am (EST) Mon, June 23, 1997. Winner will be determined in a random drawing on or about 5:00 pm (EST) Mon., June 23, See official rules in the Computer Carrers section.



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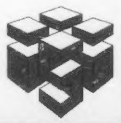

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ADVERTISERS INDEX

Advertiser	Page
Advanced Logic Research http://www.alr.com	66
American Power Conversion http://www.apcc.com 888-289-APCC	52-53
Auspex Systems, Inc http://www.auspex.com	54-55
Cisco http://www.cisco.com	30-31
Clarify http://www.clarify.com	119
Compaq Computer Corp. http://www.compaq.com	18-19, 58-59
Computer Associates http://www.cai.com	5
Compuware http://www.compuware.com	17
Data General http://www.dg.com	126
Digital Equipment Corp http://www.digital.com	24-25, 67, 69
EMC Corp. http://www.emc.com	40
Forté http://www.forte.com	11
Gateway 2000 http://www.gateway.com	G1-G3
Great Plains Software http://www.gps.com	117
GTE http://www.gte.com	76
Hewlett-Packard http://www.hp.com	15, 36, 93
Hitachi PC http://www.hitachipc.com	42
IBM http://www.ibm.com	46, 78-79+, 89
Imation http://www.imation.com	43, 120
Intel http://www.intel.com	38-39
JD Edwards http://www.jdedwards.com	74
Kingston Technology http://www.kingston.com	C4
Leadership Series	32/33
Lexmark http://www.lexmark.com	68
Lotus Development Corp. http://www.lotus.com (800) 343-5414	C3
Lucent Technologies http://www.lucent.com	27, 28
MaxStrat http://www.maxstrat.com	20
MCI http://www.mci.com	13
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Red Brick http://www.redbrick.com	73
SAS Institute http://www.sas.com	70, 122
Silicon Graphics http://www.sgi.com	62
Softbank	112
Standard Microsystems http://www.smc.com	99+
Sun Microsystems http://www.sun.com	21, 23
Tandem http://www.tandem.com	44-45, 124
Trend Micro, Inc. http://www.trendmicro.com	37
Unisys http://www.unisys.com (800) 874-8647 X100	64-65
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Now when you build
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can be on course.

The Week in Stocks

Gainers		Losers	
PERCENT			
ParcPlace Systems Inc.	33.3	NetFrame(L)	-26.3
Applix Inc.	28.0	Computervision Corp.	-23.8
Netrix Corp.	21.4	Streamlogic Corp.(L)	-21.4
Scientific Atlanta Inc.(H)	20.7	Xircom	-21.3
Mentor Graphics	13.9	BDM International Inc.	-19.0
Cambex Corp.	13.6	Optical Data Systems Inc.	-18.5
Truevision Corp.	12.5	Xylan Corp.	-17.2
Standard Microsystems Corp.	12.5	IPL Systems Inc.	-15.6
DOLLAR			
Microsoft Corp.	6.69	BDM International Inc.	-5.25
Lucent Tech.(H)	5.50	Computer Sciences	-3.88
Xerox Corp.(H)	5.38	Security Dynamics Tech.	-3.38
Bell Atlantic Corp.(H)	4.50	Ascend Communications	-3.25
IBM	4.25	Xilinx	-3.25
Motorola Inc.	3.75	Xylan Corp.	-3.13
Scientific Atlanta Inc.(H)	3.63	LSI Logic Corp.	-3.13
Electronic Data Systems Corp.	3.63	Reynolds and Reynolds	-3.00

INDUSTRY ALMANAC

EMC rides high on storage

EMC Corp. (NYSE:EMC), an enterprise storage vendor in Hopkinton, Mass., is riding high these days. Its stock price has hovered around $40 in recent weeks — double its price a year ago. Analysts say that is because EMC is starting to dominate the high-end and mainframe mass storage markets.

The company took a hit in April when its stock price dived 20%, from $41 to $32. It improved, however, in May. That encouraged PaineWebber, Inc. in San Francisco to upgrade EMC to Attractive.

Paul Weinstein, managing director at PaineWebber, says the price was "crushed" due to a glut of inventory, something he expects to be resolved in the second half of the year.

Alex. Brown & Sons, Inc. in San Francisco lists EMC as a Strong Buy, meaning it will far outperform the market. "It's attractive because of their leading open systems position in the high end of mass storage and their leading market share in mainframe mass storage," according to a statement from analyst Phil Rueppel.

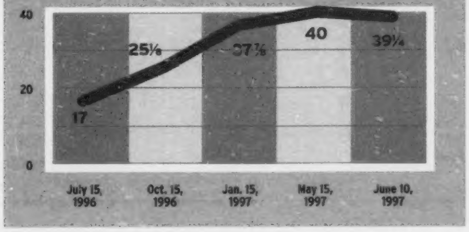
It helps that EMC provides software for storage management, he says. "The business of mass storage is no longer simply delivering hard-disk drive capacity, but rather one of delivering storage functionality so that users can best leverage enterprise information," Rueppel says.

Weinstein says he expects EMC to charge ahead in the coming months. "The key is their open systems business," he says. "It will be the driving engine in the next two or three years."

Salomon Brothers, Inc. in San Francisco lists EMC as a Buy, with earnings of 49 cents per share expected by the end of this month, when the second quarter draws to a close. That compares with earnings of 36 cents a share in the same period a year ago. — Matt Hamblen

DOUBLE TIME

EMC's stock performance reflects its dominance in the high-end mainframe storage market



Exch	52 Week	Range		June 13 2 pm	Wk Net Change	Wk Pct Change
Communications and Network Services						**UP 0.21%**
COMS	81.38	24.00	3 COM Corp.	47.56	2.06	4.5
AIT	69.88	49.63	AMERITECH Corp.	69.88	3.25	4.9
ASND	80.25	36.13	Ascend Communications	43.13	-3.25	-7.0
T	43.25	30.75	AT & T	37.63	2.50	7.1
BNYN	10.38	1.19	Banyan Systems Inc.	1.94	0.13	6.9
BAY	30.63	15.38	Bay Networks Inc.	23.13	1.13	5.1
BEL	77.25	55.13	Bell Atlantic Corp. (H)	77.25	4.50	6.2
BLS	47.88	35.25	Bellsouth Corp.	47.88	2.50	5.5
BRKT	42.25	9.75	Brooktrout Technology	13.25	-0.88	-6.2
CS	46.50	26.50	Cabletron Systems	31.63	1.00	3.3
CSCC	91.25	23.50	Cascade Communications	30.00	-2.00	-6.3
CGRM	17.50	8.63	Centigram Communications	11.75	-0.13	-1.1
CSCO	75.75	44.75	Cisco Systems Inc.	66.50	2.00	3.1
CMNT	9.13	4.75	Computer Network Tech.	4.81	-0.19	-3.8
XCOM	11.25	4.75	CrossComm	9.88	0.00	0.0
DIGI	33.13	12.63	DSC Communications	23.81	-0.69	-2.8
FORE	43.63	10.00	FORE Systems Inc.	14.63	-1.31	-8.2
GDC	17.63	6.13	General Datacomm Inds.	8.13	-0.75	-8.5
GSX	46.75	36.13	General Signal Networks	46.25	2.63	6.0
GTE	49.38	37.75	GTE Corp.	46.25	1.63	3.6
LU	69.38	30.63	Lucent Tech. (H)	69.38	5.50	8.6
MADGF	30.38	4.50	Madge Networks NV	6.31	-0.31	-4.7
MCIC	41.88	22.38	MCI Communications Corp. (H)	39.75	0.25	0.6
MNPI	17.00	5.50	Microcom Inc.	16.13	-0.06	-0.4
NETM	16.50	2.50	NetManage Inc.	3.25	-0.06	-1.9
NTRX	10.88	1.44	Netrix Corp.	2.13	0.38	21.4
NCDI	16.25	3.00	Network Computing Devices	12.25	0.75	6.5
NWK	29.00	11.13	Network Equipment Tech.	16.25	-1.13	-6.5
NETG	30.25	12.88	Network General	14.81	-0.13	-0.8
NN	43.50	20.25	Newbridge Networks Corp.	41.75	1.88	4.7
NT	89.88	45.00	Northern Telecom Ltd. (H)	89.88	2.13	2.4
NOVL	14.63	7.00	Novell Inc.	7.75	0.00	0.0
NYN	59.00	42.00	Nynex Corp. (H)	59.00	3.50	6.3
OCTL	31.75	13.50	Octel Communications Corp.	22.00	0.50	2.3
ODSI	25.88	9.75	Optical Data Systems Inc.	12.63	-2.88	-18.5
PCTL	41.25	8.25	Picturetel Corp.	10.88	-1.25	-10.3
PTON	5.63	1.31	Proteon Inc.	2.25	-0.06	-2.7
RACO	6.50	2.25	Racotek Inc.	2.56	-0.19	-6.8
RETX	9.25	3.38	Retix	4.75	-0.44	-8.4
SBC	60.13	46.00	SBC Communications (H)	60.13	1.25	2.1
SFA	21.13	12.00	Scientific Atlanta Inc. (H)	21.13	3.63	20.7
SHVA	87.25	8.25	Shiva Corp.	11.50	-0.75	-6.1
FON	51.38	34.50	Sprint Corp.	51.38	3.50	7.3
SMSC	17.88	8.25	Standard Microsystems Corp.	10.13	1.13	12.5
USW	38.25	27.25	U S West Inc.	38.25	1.88	5.2
USRX	98.25	40.75	US Robotics	81.50	2.13	2.7
XIRC	31.13	7.50	Xircom	10.63	-2.88	-21.3
XYLN	59.38	12.38	Xylan Corp.	15.00	3.13	-17.2
PCs and Workstations						**UP 1.43%**
AALR	15.25	6.13	Advanced Logic Research	12.13	0.38	3.2
AAPL	27.75	15.13	Apple Computer Inc.	16.00	-0.63	-3.8
ASTA	8.38	3.94	AST Research Inc.	5.31	0.06	1.2
CPQ	110.38	40.50	Compaq Computer Corp.	100.63	-1.00	-1.0
DELL	115.75	20.25	Dell Computer Corp.	113.88	3.25	2.9
GTW	75.38	27.75	Gateway 2000 Inc.	63.75	1.00	1.6
HWP	60.00	37.75	Hewlett Packard Co.	53.75	1.38	2.6
MUEI	25.38	8.75	Micron International Inc.	17.25	0.38	2.2
NIPNY	72.50	49.88	NEC America (H)	71.88	0.25	0.3
SGI	28.38	12.63	Silicon Graphics	17.00	-0.13	-0.7
SUNW	35.69	22.00	Sun Microsystems Inc.	35.69	2.38	7.1
Large Systems						**UP 0.34%**
AMH	14.00	8.13	Amdahl Corp.	9.94	0.00	0.0
DGN	25.00	9.00	Data General Corp. (H)	25.00	1.50	6.4
DEC	48.75	25.00	Digital Equipment Corp.	36.00	1.13	3.2
IBM	91.88	44.63	IBM	89.50	4.25	5.0
MDCD	17.38	2.88	Meridian Data Inc.	4.63	0.50	12.1
NETF	6.00	0.88	NetFrame (L)	0.88	-0.31	-26.3
SQNT	20.13	10.50	Sequent Computer Sys.	19.19	0.06	0.3
TEXM	3.88	1.88	Sequoia Systems Inc.	3.50	0.00	0.0
SRA	49.63	16.63	Stratus Computer Inc. (H)	47.13	-0.25	-0.5
TDM	15.13	8.63	Tandem Computers Inc.	14.75	0.38	2.6
UIS	8.00	5.38	Unisys Corp.	6.88	0.06	0.9
Software						**OFF 0.28%**
ADBE	49.00	28.50	Adobe Systems Inc.	41.75	-1.25	-2.9
AMSWA	8.75	3.75	American Software Inc. (H)	8.50	0.50	6.3
APLX	40.00	3.13	Applix Inc.	6.56	1.44	28.0
ARSW	63.00	17.00	Arbor Software	30.44	1.69	5.9
ADSK	40.88	18.50	Autodesk Inc.	37.38	-1.13	-2.9
BGSS	32.50	19.00	BGS Systems Inc.	30.50	0.00	0.0
BMCS	56.13	25.38	BMC Software Inc.	53.50	1.00	1.9
BOOL	27.50	14.00	Boole and Babbage	22.63	0.38	1.7
BORL	11.13	4.75	Borland Int'l Inc.	7.00	-0.06	-0.9
BOBJY	42.00	7.25	Business Objects	9.75	-1.13	-10.3
CAYN	9.25	3.00	Cayenne Software Inc.	4.13	0.13	3.1
CNTR	6.50	1.13	Centura Software	1.47	-0.03	-2.1
COGNF	39.50	18.25	Cognos Inc.	33.00	1.75	5.6
CA	67.88	37.25	Computer Associates	57.75	3.50	6.5
CVN	11.38	3.13	Computervision Corp.	4.00	-1.25	-23.8
CPWR	49.25	16.13	Compuware Corp.	46.63	-0.50	-1.1
CSRE	32.00	10.75	Comshare Inc.	13.13	0.63	5.0
COSFF	12.88	5.00	Corel Corp.	5.94	-0.25	-4.0
DWTI	7.00	2.63	Dataware Technologies Inc.	3.56	-0.25	-6.6
FILE	47.25	9.50	Filenet Corp.	13.75	-2.25	-14.1
FRTE	56.50	7.25	Forte Software	11.00	-1.44	-11.6
FTPS	10.63	4.31	FTP Software Inc.	5.50	-0.06	-1.1
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INGR	13.13	6.25	Intergraph Corp.	7.69	0.69	9.8
LEAF	8.13	0.81	Interleaf Inc.	1.44	-0.06	-4.2
ISLI	11.25	6.25	Intersolv Inc.	9.06	-0.25	-2.7
INTU	54.75	20.88	Intuit Inc.	24.38	-2.13	-8.0
TLC	27.75	5.50	Learning Co. (The)	7.63	-0.38	-4.7
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MCAF	70.00	27.88	McAfee Associates	60.88	-0.94	-1.5
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MGXI	17.75	4.00	Micrografx Inc.	6.50	-0.63	-8.8
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WANG	24.06	15.38	Wang Laboratories Inc.	20.25	-0.50	-2.4
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AOL	60.50	22.38	America On-Line (H)	58.00	1.13	2.0
BBN	29.38	15.13	BBN Corp.	28.88	0.00	0.0
CSRV	26.38	8.63	Compuserve Corp.	10.63	-0.25	-2.3
EDFY	38.25	8.88	Edify Corp.	13.50	1.44	11.9
LCOS	22.75	5.75	Lycos Inc.	12.50	-0.50	-3.8
NETC	35.75	7.88	Netcom On-Line	16.50	1.44	9.5
NSCP	68.50	23.50	Netscape Comm. Corp.	31.56	-1.25	-3.8
OMKT	33.75	6.50	Open Market Inc.	11.00	0.25	2.3
PSIX	17.25	5.50	PSINet	8.75	-0.13	-1.4
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[illegible]	48.50	10.25	Advanced Micro Devices	38.00	-0.13	-0.3
[illegible]	29.25	12.75	Analog Devices Inc.	26.00	1.13	4.5
CHPS	26.50	7.88	Chips and Technologies	10.06	-0.31	-3.0
CRUS	24.25	8.00	Cirrus Logic	10.56	-1.06	-9.1
CY	16.63	9.13	Cypress Semiconductor Corp.	14.88	1.38	10.2
CYRX	31.00	11.50	Cyrix	21.19	-2.94	-12.2
INTC	169.75	64.13	Intel Corp.	145.56	-0.19	-0.1
LSCC	62.63	19.75	Lattice Semiconductor	55.88	-1.75	-3.0
LSI	46.88	17.00	LSI Logic Corp.	35.13	-3.13	-8.2
MCRL	54.50	12.00	Micrel Semiconductor Inc.	48.25	-1.50	-3.0
MU	45.25	16.63	Micron Technology	40.75	-0.25	-0.6
MOT	69.75	44.13	Motorola Inc.	69.75	3.75	5.7
NSM	32.25	13.00	National Semiconductor	27.88	0.13	0.5
TXN	96.38	40.50	Texas Instruments	85.63	0.63	0.7
VLSI	29.25	10.38	VLSI Technology	21.75	-0.63	-2.8
XLNX	58.50	24.50	Xilinx	47.38	-3.25	-6.4
ZLG	34.25	14.88	Zilog Inc.	20.50	-0.88	-4.1
Peripherals and Subsystems						**OFF 0.94%**
ADPT	[illegible]	17.50	Adaptec Inc.	35.50	2.88	8.8
APCC	31.50	8.50	American Power Conversion	21.19	-1.69	-7.4
CBEX	6.75	0.97	Cambex Corp.	1.56	0.19	13.6
CREAF	20.25	3.50	Creative Technology Ltd.	15.38	-0.25	-1.6
RACE	24.50	5.00	Data Race Inc.	14.63	0.63	4.5
DTM	12.50	5.25	Dataram Corp.	9.88	0.19	1.9
EMC	41.75	16.50	EMC Corp.	37.75	-0.25	-0.7
EMLX	21.25	12.88	Emulex Corp.	19.00	0.50	2.7
ESCC	29.75	19.50	Evans and Sutherland (H)	28.13	-0.75	-2.6
EXBT	17.50	9.50	Exabyte	12.88	0.00	0.0
IISLF	4.13	1.25	Intelligent Info. Systems	1.50	-0.06	-4.0
IOM	46.50	12.63	Iomega Corp.	20.50	0.63	3.1
IPLS	6.00	0.94	IPL Systems Inc.	1.19	-0.22	-15.6
KMAG	36.75	17.63	Komag Inc.	26.38	-0.75	-2.8
MTSI	29.75	12.88	MicroTouch Systems Inc.	22.00	-2.25	-9.3
PNCL	10.13	0.97	Pinnacle Micro Inc.	1.31	-0.19	-12.5
AQM	6.38	2.38	QMS Inc.	3.13	0.00	0.0
QNTM	25.00	5.50	Quantum Corp.	20.25	0.50	2.5
RDUS	3.84	0.25	Radius Inc.	0.31	0.00	0.0
SEG	56.25	18.13	Seagate Technology	39.75	1.50	3.9
STK	54.38	30.00	Storage Technology	41.38	0.88	2.2
STLC	5.63	0.34	Streamlogic Corp. (L)	0.34	-0.09	-21.4
TEK	59.75	35.88	Tektronix Inc.	57.25	0.50	0.9
WDC	38.63	10.00	Western Digital Corp.	29.38	0.63	2.2
XRX	72.75	44.63	Xerox Corp. (H)	72.75	5.38	8.0
Services						**UP 0.23%**
AMSY	37.13	15.75	American Mgmt. Systems	25.88	0.13	0.5
ANLY	36.75	17.50	Analysts Int'l	35.75	0.13	0.4
AUD	49.50	35.63	Auto Data Processing	48.88	0.38	0.8
BDMI	30.75	19.75	BDM International Inc.	22.38	-5.25	-19.0
CATP	37.25	18.75	Cambridge Tech. Partners	32.63	2.50	8.3
CEN	53.63	29.50	Ceridian Corp.	39.63	-0.13	-0.3
CDO	38.50	22.63	Comdisco Inc.	37.25	0.63	1.7
CPU	30.88	13.25	CompUSA Inc.	20.63	-1.25	-5.7
CHRZ	39.63	10.13	Computer Horizons (H)	35.94	-1.40	-3.7
CSC	86.50	57.88	Computer Sciences	74.38	-3.88	-5.0
TSK	33.75	11.63	Computer Task Group (H)	33.75	1.38	4.2
CDAT	28.63	12.75	Control Data Systems Inc.	15.00	0.00	0.0
EGGS	12.75	3.63	Egghead Discount Software	4.56	-0.06	-1.4
EDS	63.38	31.75	Electronic Data Systems Corp.	41.50	3.63	9.6
INAC	40.63	15.38	Inacom Corp.	29.88	-0.75	-2.4
INEL	10.88	2.25	Intelligent Electronics	3.19	0.19	6.3
KEA	57.75	16.38	Keane Inc.	55.63	0.38	0.7
MICA	25.00	10.50	MicroAge Inc.	17.00	-0.88	-4.9
PAYX	42.50	25.63	Paychex	37.75	1.25	3.4
PMS	55.50	33.13	Policy Management Sys.	52.63	1.75	3.4
REY	30.63	18.63	Reynolds and Reynolds	19.75	-3.00	-13.2
SCBI	25.75	14.44	SCB Computer Tech. Inc. (H)	25.75	0.75	3.0
SEIC	25.75	17.75	SEI Corp.	23.38	0.75	3.3
SMED	66.88	36.75	Shared Medical Systems	51.94	1.44	2.8
SSPE	33.50	12.75	Software Spectrum Inc.	13.50	0.19	1.4
SDS	50.75	35.37	Sungard Data Systems (L)	44.88	2.88	6.8
VST	29.75	6.50	VanStar Corp.	10.13	0.56	5.2

KEY: (H) = New annual high reached in period (L) = New annual low reached in period

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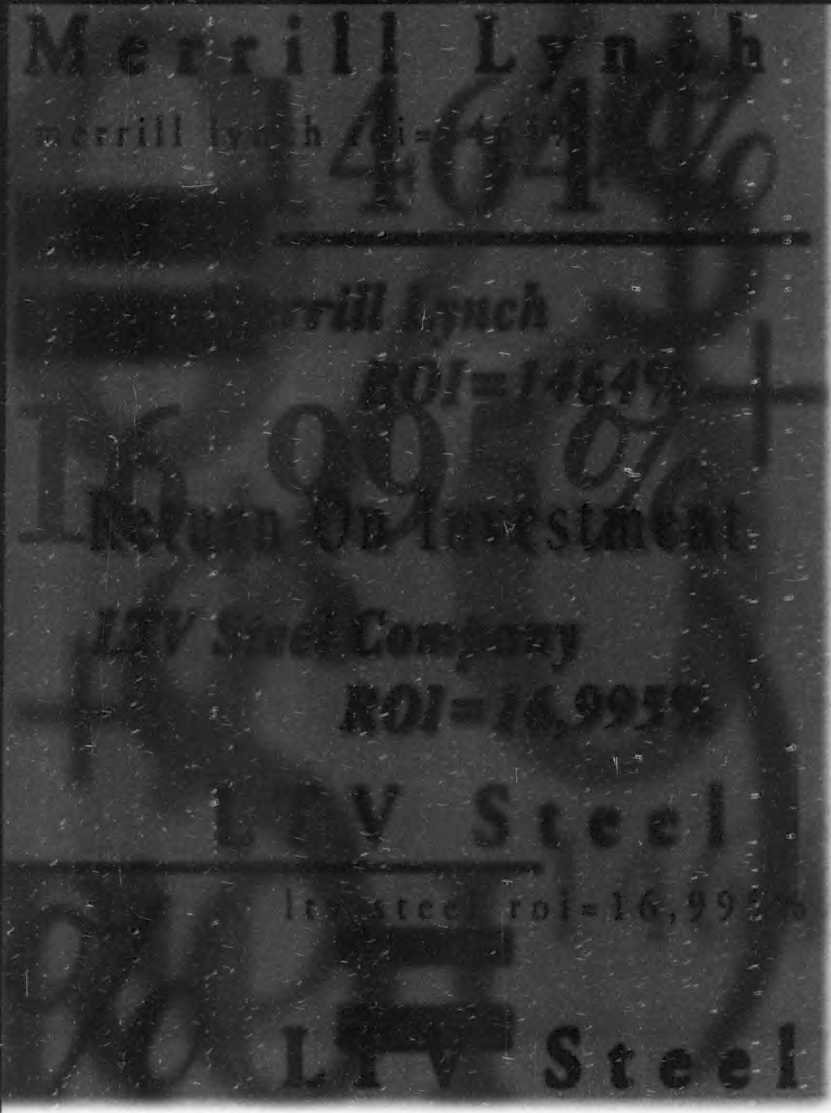
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Companies in this issue

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WHAT'S THE DIFFERENCE?

Device	Features	Vendors
NetPC	• Works like a PC • Has no floppy drive • Operating system and applications are managed and loaded centrally • Box is sealed so users can't change its configuration	• Dell • Compaq • IBM
Network computer	• Work is done at the server level • Costs less than PCs • Managed remotely and centrally • Generally has no hard disk drive	• Computing Devices • Wyse Technology
Handheld	• Offers E-mail and calendaring • Limited network connectivity	• Compaq • U.S. Robotics • HP

New devices need management

CONTINUED FROM COVER 1

lyst at Dataquest in San Jose, Calif., said users should ignore the hype of hardware that was designed to cut costs — such as the network computer and the NetPC — and first move aggressively to address the management issues they face.

Chris Goodhue, an analyst at Stamford, Conn.-based Gartner Group, Inc., has even advised organizations to hold off on any major investments until the middle of next year or so. "Compelling" management pieces will fall into place around that time, he said.

DESKTOP COSTS

TECH PARADE

Users at this week's PC Expo in New York will find plenty of offerings that feed the hype and showcase the vast array of desktop choices.

But leading the pack, and preempting that display, is the formal unveiling of the NetPC.

Gartner called NetPCs, which are based on specifications laid out by Intel Corp. and Microsoft Corp., the heir apparent to the plain-Jane desktop PCs and their sometimes unnecessary, always more expensive bells and whistles.

About a dozen suppliers are lining up to unwrap boxes that support the NetPC reference spec, including heavyweights IBM, Dell Computer Corp. and Compaq Computer Corp. The NetPC spec calls for a sealed-case PC without a floppy drive or fancy peripherals. It was designed to enable remote troubleshooting and centralized software distribution and management — all of which can help reduce total cost of ownership.

The NetPC, which also features management software underpinnings, is turning heads at companies that include Norwest Corp. in Minneapolis. Norwest hopes to reduce annual desktop costs from about $9,000 to $5,500.

"This should prevent the kind of end-user futzing that occurs when users have a floppy drive or try to change things themselves," said Dave Quady, a senior systems engineer at Norwest and a beta tester of IBM's NetPC. Norwest has 29,000 PCs in more than 3,600 offices around the world.

Norwest already physically disables floppy drives and uses an IBM product to support remote software distribution.

To cut costs further, Quady is considering using IBM's LANClient Control Manager, which will ship with its NetPC, and Intel's LANDesk software, a remote troubleshooting and software distribution application.

Enabling remote troubleshooting and a centralized backup for what is stored locally should help, Quady said.

Norwest favors the NetPC model over server-centric network computers because it won't have to switch applications or change its server or network infrastructure to support the NetPCs, Quady said.

"The NetPC steals a lot of the [network computer's] thunder, because it preserves a company's current investment in software," Brookwood said.

But Brookwood also noted that management is becoming more important as the desktop becomes increasingly fragmented because of the multiple options for personal systems.

GRAB BAG

Although Microsoft's Windows operating systems will incorporate many new management tools, Windows NT 5.0 and Memphis — the next version of Windows 95 — probably won't ship until next year.

For now, users can get add-ons for Windows 95 and NT 4.0 that contain Zero Administration for Windows.

Meanwhile, users such as Paul Maszczak, a corporate director at CR Bard, Inc. in Murray Hill, N.J., use "virtually some of everything out there."

Maszczak supports about 4,000 users. He said he is looking at several management packages, including Microsoft's Systems Management Server and an application from Platinum Technology, Inc.

He said many management applications fail to continue to work once hardware or software configurations change.

Maszczak said he is evaluating NetPCs for about 500 users but is concerned that some users will consider them an "ego buster." But, he noted bemusedly, "I'm sure we'll get past that when we make the cost vs. benefits known." □

& **Wintel desktop vendors gear up for NetPC demos at PC Expo. Page 63**

Users take direct turn to cut costs

CONTINUED FROM COVER 1

tor's skills."

One PC maker, who requested anonymity, said most manufacturers have margins in the range of 15%. He predicted that the more direct sellers sell to corporations, the more they'll begin to lose margin advantage because they'll have to build extensive infrastructures of sales and support staff.

"Those companies that require us to go through a reseller give us a pain in the neck," said Briscoe Stephens, the advanced scientific information systems coordinator at NASA's Marshall Space Flight Center in Huntsville, Ala.

Stephens said resellers generally don't have up-to-date technical information. He said it can take up to three months to get products from a reseller compared with a week by going direct.

Jacqueline Germany, director of enterprise networks at World Color Press in Greenwich, Conn., said she also prefers the direct approach. "You get everything for one price," she said. "You don't get anything value-added that bumps up the price, like bundled software."

That's a key point, said John Dunkle, an analyst at Workgroup Strategic Services, Inc. in Portsmouth, N.H. "Direct sellers [go] to great lengths to customize the software preload — adding the perception of value."

According to a recent *Computerworld* poll of 886 users at companies with more than 500 employees, 21% said they buy notebooks from the manufacturer by telephone, and 35% said they order from a reseller. Of 1,006 PC users, 24% said they purchase PCs from the manufacturer by phone, and 34% do so from a reseller.

Dunkle said users will increasingly turn to direct sellers such as Dell Computer Corp. in Round Rock, Texas, and Gateway 2000, Inc. in North Sioux City, S.D., for PCs and laptops.

In recent months, even desktop kingpin Compaq Computer Corp. in Houston redoubled its off-again, on-again efforts to be more direct in its sales strategy.

Compaq officials said the company will build to order in some cases, and it will let its resellers do some on-site assembly of machines.

But many users still prefer resellers.

"We think we get better support through the resellers," said Vincent Malitto, manager of information technology architecture at Praxair, Inc. in Danbury, Conn. "From time to time, we toss around the idea of a direct sale, and we are open to it in the future — if we can save money." □

Senior writer April Jacobs contributed to this story.

PURCHASING CHANNELS

Which channel do you use to buy Notebooks and PCs?

	Notebooks	PCs
Value-added reseller	35%	34%
Manufacturer via the telephone	21%	24%
Retail store	21%	16%
Manufacturer's salesperson	14%	15%
Manufactuer's Web site	1%	1%
Other	9%	11%
	Base: 2,678*	Base: 3,102*

* Respondents with PC purchasing roles

Source: *Computerworld* survey

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Pardon me while I vent

David Coursey

I should have been running my business today. Instead, I just finished reinstalling my mail server — for the third time, I believe. It's 9:45 p.m., and between us, I and my long-suffering IS guy have been at it all day.

We don't know *why* we had to mess around with the mail server, mind you, but we did. And we're none too happy about it.

OK, I'd been warned about Microsoft Exchange, and I didn't listen. Nor did I listen to the warnings about Windows NT 4.0. But having spent about 100 hours (spread over three months) messing with this machine, I'm exasperated. Sure, I like Microsoft Outlook, and if I really want to make the most of it, I've got to use Exchange. But at some point, it makes more sense to actually do the work than mess around with tools that are supposed to make the work easier but don't measure up.

From the E-mail I get, I know you share my frustration. Every few days, I hear from someone who's upset that this or that server or application just isn't easy enough to install, use or maintain. Walt Mossberg, the distinguished technology columnist at *The Wall Street Journal*, got it right when he wrote, "Computers are too hard to use, and it's not your fault."

When I got started in personal computing with a CP/M Kaypro, it seemed that if only I had a 1,200 bit/sec. modem and a 10M-byte hard drive, my life would be complete. Now, 16 years later, I can fill a 2G-byte hard drive and redline a 200-MHz Pentium with hardly a thought. Am I doing more with this computer? Sure, but one thing has remained almost constant: The amount of time the computer saves me is offset by time spent getting the computer running and keeping it happy.

MICROSOFT'S ROLE

Microsoft is a major contributor to the problem. Everything Microsoft does is supposed to be easier to use, but it never quite is. Every user interface is supposed to have been tested on hundreds of lab animals, er, users, but the interfaces change so quickly, I have to wonder. Yes, I love Office 97, but did I really need it? Especially with the RTF file format/ interoperability problem that won't be fixed until the "service" release this summer? I feel like I've been serviced, all right.

Are we really well-served when we're forced to do all this learning and relearning on an almost annual basis? Microsoft talks about reducing training costs. Has it figured out how much we'd save if it simply left us alone for a while?

You'd think that having vanquished the competition, Microsoft might slow down a bit. That will never happen, of course -- Microsoft has to keep us Windows addicts buying software upgrades so it can invest billions of dollars in cable television, among other things.

Next thing you know, we'll need Microsoft software to watch TV. The good news is that, if that software is as unstable as my Windows 95 desktop, our children will soon be quite safe.

Forget the rating system; just buy MS-TVOS and you won't have to worry about what the tykes are watching ever again.

End of flame. ☐

Coursey, an analyst and consultant, is editor of "coursey.com," an online newsletter available at www.coursey.com. His E-mail address is david@coursey.com.

Dirty little secrets of Java, ActiveX

Frank Hayes

What are Sun and Microsoft waiting for? The brain trusts that gave us Java and ActiveX are sitting on technology that will solve the biggest problems with those Internet software development systems. But nobody seems to be in a big hurry to get those fixes into the hands of users.

Java and ActiveX need some help. Java, Sun's system for building Internet software, is great at protecting a user's system from damage that a truant Java applet might cause. But Java software has to be downloaded each time it's used, and it runs painfully slowly.

ActiveX, Microsoft's system for building Internet software, runs as fast as any native Windows application. ActiveX components also install themselves on a PC, so they don't have to be downloaded again and again. But because ActiveX allows complete access to your system, ActiveX components can erase your hard disk, send your files to remote locations and generally wreak havoc.

Sounds as if you've got to choose your poison, doesn't it? But it isn't true.

The dirty little secrets of Java and ActiveX are that Sun and Microsoft have the technology to fix those problems but aren't using it.

Take Java's performance problems. There are two easy ways to speed up Java: with a just-in-time (JIT) compiler or with caching.

A JIT compiler grabs a Java applet just before it runs and optimizes it on the fly to run faster. Netscape Navigator and Microsoft Internet Explorer have JIT compilers built in.

But Sun's JavaSoft division — which has Java accelerator technology — still doesn't include it in the standard Java Development Kit. The result: A Java application such as Corel Office for Java runs fine inside a browser but drags as a stand-alone program.

But browsers have their own problems. To run a Java applet that's part of a Web page, the Java files must be downloaded and run through the JIT compiler. That chews up a lot of time and makes users feel like Java takes forever to start.

And then, after it has finished running, the Web browser *throws the applet away*. So the next time you want to run that applet, you have to again wait for it to download and JIT-compile.

Dumb? You bet. If JavaSoft arm-twisted browser makers to cache Java applets the way Web pages and pictures are cached, they wouldn't have to waste all that time.

What's holding up these improvements? Is JavaSoft too busy stamping out bugs in the latest release of Java? Or is Sun worried about alienating Symantec, Borland and other companies that sell JIT compilers? Would Java caching give browsers too big an advantage over Sun's network computers — or does Sun naively think Java's performance isn't a problem?

Meanwhile, Microsoft is sitting on solutions to ActiveX's security problems. Last year, in the midst of a buying binge, Microsoft snapped up a Berkeley, Calif.-based start-up called Colusa Software.

Colusa's main product, OmniVM, works a lot like Java's virtual machine, except that OmniVM uses C and C++, ActiveX's languages. It supposedly runs programs as fast as compiled C++ code. And, like Java, it runs programs in a secured "sandbox," which would keep ActiveX components from misbehaving.

Microsoft executives waxed enthusiastic last year about their plans to use Colusa's technology. But where is it? Is Microsoft worried that the new compilers and incompatible code format OmniVM requires will scare away ActiveX developers? Is it afraid OmniVM will look like a Java rip-off? Or is OmniVM mired in the swamp of the delayed Windows 97?

Or are Microsoft and Sun keeping those technologies in reserve as trump cards each can play against the other?

You'd think by now they'd have learned two key rules of this game of Internet time: Don't hold your cards too close, and don't hold them too long. Because what you don't use, you'll lose.

And that includes customers. ☐

Hayes is Computerworld*'s staff columnist. His Internet address is frank_hayes @cw.com.*

The Back Page

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Dispatches & images from the fringes of the electronic frontier

JAPANESE INVENT WIND-UP PC ... REALLY

Folks at Seiko Epson in Japan were so fed up with dead laptop batteries, they invented a hand-cranked PC. "A user is able to input his own kinetic energy into the system by turning a winding key... similar to winding up a large windup alarm clock," according to U.S. Patent No. 5,630,155, awarded May 13. When the battery starts to die, a red-alert message tells the user to crank the mainspring. – Mitch Betts

HAL MAYFORTH

Usenet forums

Usenet newsgroup discussion threads found recently on the Internet. You may be able to pick up the thread by entering keywords at www.dejanews.com.

- More dangers of E-mail to the wrong users (comp.risks)
- Java vs. C++ performance comparison (comp.software-eng)
- How do you code in front of strangers [at a job interview]? (comp.software-eng)
- Why not Solaris on Alpha? (comp.sys.dec)
- Why people accept bad keyboards (alt.folklore.computers)
- Tubes in computers (alt.folklore.computers)

Dead Voters Society

Nearly 17% of the people on U.S. voter registration lists are dead or have moved away, according to a database study on the Internet's Dead Voters page ***(products.aristotle.org/pages/deadv.htm)***. Arizona has the most deadwood on its voter lists, Alabama the least.

A PC any Bubba can use

You know the *Dummies* books. Now meet Bubba, the mascot/spokesmodel of Stupid PC, Inc., an Atlanta start-up *(www.stupidpc.com)* out to prove that buying a PC can be fun. The Stupid PC costs $795. The price includes a 133-MHz Pentium processor, 2G-byte hard drive, monitor, modem, two free months of Internet access, a cup holder and a geeky T-shirt. Stupid PC offers free delivery and setup in the Atlanta area – PCs are delivered like pizzas by a fleet of colorful Volkswagen Beetles – and hopes to go nationwide in six months.

Inside Lines

Rent me some groupware

At this week's PC Expo in New York, Lotus will take the wraps off Instant Team Room, a rentable collaboration application for Domino servers, sources said. The application was designed to be hosted by Internet service providers and accessed via Web browsers.

This funny money ain't so funny ...

Internal chargebacks for IS services or resources have often been derided as "funny money" transactions about shared corporate resources. So, who uses the most? One large company turned off the software that monitored its mainframe for chargeback billing and found out the monitor was consuming a full 30% of the mainframe cycles.

Chairmen of the billboard

The Oracle/Informix billboard war keeps flaring in Silicon Valley. Informix last week replaced its "Dinosaur Crossing" billboard near Oracle with one proclaiming benchmark superiority over Oracle7. Oracle CEO Larry Ellison said he may put up a billboard reprinting Informix's apology for accusing a group of engineers who defected to Oracle of taking trade secrets with them. Meanwhile, Sybase CEO Mitchell Kertzman said he thought about putting a billboard halfway between the two squabblers with a quote from a Stealer's Wheel song: "Clowns to the left of me, jokers to the right."

Yes, but will they crash?

Ellison fairly bristled last week when he was asked how many network computers Oracle had shipped or taken orders for thus far. "That's a little like asking the Wright brothers, 'If air travel is so good, how many passengers have you flown?' " Ellison sniffed.

Show me the rebate

Officials at U.S. Robotics said a "human error" that caused a mix-up in getting rebates to users of 33.6K bit/sec. modems was fixed, and checks have been sent. The company said the fulfillment house handling the rebates mistakenly sent out postcards telling users they didn't qualify.

Tough choice

Users at SAP AG's European user group conference last week faced a familiar choice. SAP had to share space at an Amsterdam convention center with the International Headache Society. A sign at the entrance directed users to go left for the user group conference or right for "Headaches." No word yet on how many R/3 users steered right.

Microsoft does use the AS/400

Rumors that Microsoft runs its business on the AS/400 have finally been answered. The answer is yes, kind of. At last week's AS/400 Environment Conference in Dallas, Ed Muth, a Microsoft business manager, said the IBM nemesis uses AS/400s to run about 10% of its transaction processing needs, and mostly in foreign subsidiary offices. The box is a better fit for foreign offices with few IS resources than Windows NT Server, which requires more maintenance and care, he said.

Racking up the miles

Planning a far-out summer family vacation? The folks at the Franklin Institute Science Museum in Philadelphia have created a great resource package for families planning a trip to Mars. Movies, weather reports and lodging information for the Red Planet can all be found at *www.fi.edu/qa97/spotlight6/*. Take plenty of sandwiches.

Last Thursday wasn't a great technology day at Microsoft. When a reporter called to ask why www.microsoft.com *was inaccessible, a company spokesperson explained that she had E-mailed a request for information on whether or not the site had a problem. But soon after, her E-mail server went down. If you're having trouble getting through, give news editor Patricia Keefe a call at (508) 820-8183, or E-mail her at patricia_keefe@cw.com.*

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*Upgrade from 16MB to 64MB on Pentium® Pro 200 MHz. Testing was conducted by an independent service for Samsung Semiconductor, Inc. † Gartner Group Continuous Services, *Research Note*, 7/18/96. Kingston Technology Company, 17600 Newhope Street, Fountain Valley, CA 92708, (714) 435-2600, Fax (714) 435-2699.